MELSEC-ST CC-Link
Head Module

User's Manual

MITSUBISHI

MELSEC-ST

ST1H-BT

●SAFETY PRECAUTIONS●

(Read these precautions before use.)

Before using the product, read this manual and the associated manuals introduced in this manual carefully and handle the product correctly with full attention to safety.
The precautions given in this manual are concerned with this product only. Refer to the user's manual of the network system for safety precautions for the network system used.
The ● SAFETY PRECAUTIONS ● classify the safety precautions into two levels: "DANGER" and "CAUTION".

⚠ DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, operations indicated by ⚠ CAUTION may also cause serious results. Be sure to observe the instructions of both levels.

Please store this manual in a safe place for future reference, and always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠ DANGER

- Create an interlock circuit on the program so that the system will operate safely based on the communication status information. Failure to do so may cause an accident due to an erroneous output or malfunction.
  When an error occurs, all outputs are turned OFF in the MELSEC-ST system (at default).
  However, I/O operations of the head module and respective slice modules can be selected for the errors described below.
  Select the status for each module for the entire system safety.
  (1) Communication error (☞ Section 4.3.1 Output status setting for module error)
  (2) Slice module error
  The output status for the case of an error can be set to Clear, Hold or Preset with a command parameter of each slice module. (For setting availability, refer to the manual for each slice module.)
  Since the parameter is defaulted to Clear, outputs will be turned off if an error occurs.
  This parameter setting can be changed to Hold or Preset when the system safety is more ensured by holding or presetting the output. (☞ Manual for each slice module, "Combinations of various functions")

- Create an external failsafe circuit so that the MELSEC-ST system will operate safely, even when the external power supply or the system fails.
  Failure to do so may cause an accident due to an erroneous output or malfunction.
  (1) The status of output changes depending on the setting of various functions that control the output. Take sufficient caution when setting for those functions.
  (2) Outputs may be kept ON or OFF due to malfunctions of an output element or its internal circuit. For signals which may cause a serious accident, configure an external monitoring circuit.

⚠ CAUTION

- Initialize the network system after changing parameters of the MELSEC-ST system or the network system. If unchanged data remain in the network system, this may cause malfunctions.

- Do not install the control cables or communication cables together with the main circuit or power cables.
  Keep a distance of 100mm or more between them.
  Failure to do so can result in malfunctions due to noise.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Use the MELSEC-ST system in an environment that meets the general specifications described in the MELSEC-ST System User's Manual.
  Failure to do so may cause an electric shock, fire, malfunction, or damage to or deterioration of the product.

- Fix the head module and base module to the DIN rail one by one and secure them with end brackets.
  Incorrect mounting may result in a fall of the module, short circuits or malfunctions.

- Secure the module with several end brackets when using it in an environment of frequent vibrations.
  Tighten the screws of the end brackets within the specified torque range.
  If the screws are too loose, it may cause a fall of a module, short circuit, or malfunction.
  Overtightening can also cause a fall due to damage to the screw or module, short circuit, or malfunction.

- Shut off all phases of the external power supply for the whole system before mounting or removing a module.
  Failure to do so may damage the module.
  (1) Online replacement of the power distribution module and/or base module is not allowed.
  Before replacing either of these modules, shut off all phases of the external power supply.
  Failure to do so may result in damage to all devices of the MELSEC-ST system.
  (2) I/O modules and intelligent function modules can be replaced online.
  Since the online module replacement procedures vary depending on the module type, be sure to replace it as instructed.
  Refer to the user's manual of the head module for details on I/O modules, and refer to the chapter of online module change in the user's manual of each intelligent function module for details on the intelligent function module.

- Do not directly touch the module's conductive parts or electronic components.
  Doing so may cause malfunctions or failure of the module.

- Connect each connection cable securely.
  Failure to do so may cause malfunctions due to poor contact.

- Use a conductive DIN rail and be sure to ground it.
  Failure to do so may cause an electric shock or malfunctions.
  If the screws are too loose, it may cause a short circuit or malfunction.
  Overtightening can cause a short circuit due to screw damage.

[WIRING PRECAUTIONS]

⚠ DANGER

- Before installation or wiring, shut off all phases of the external power supply used by the entire system.
  Failure to do so may cause an electric shock or damage to the product.

⚠ CAUTION

- Ground the control panel, in which the MELSEC-ST system is installed, in the manner specified for the MELSEC-ST system.
  Failure to do so may cause an electric shock or malfunctions.

- Check the rated voltage and terminal layout and wire the system correctly.
  Connecting an inappropriate power supplt or incorrect wiring can result in a fire or failure.

- Tighten the terminal screws within the specified torque range.
  If the terminal screws are too loose, it may cause a short circuit or malfunction.
  Overtightening can cause a short circuit due to damage to the screw or module, or malfunctions.

- Prevent foreign matter such as dust or wiring chips from entering the module.
  Failure to do so may cause a fire, failure, or malfunctions.

- Place the communication cables or power cables connected to the module in a duct, or clamp them.
  If not, dangling cables may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunctions due to poor cable contact.

- When disconnecting the communication cable or power cable from the module, do not hold and pull the cable part.
  Pulling the cable connected to the module can damage the module and cable or can cause a malfunction due to poor contact.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠ DANGER

- Do not touch the terminals or connectors while power is on.
  Doing so may cause an electric shock or malfunctions.

- Before cleaning or retightening the terminal screws, shut off all phases of the external power supply used by the entire system.
  Failure to do so may cause the module to fail or malfunction.

⚠ CAUTION

- Do not disassemble or remodel the module.
  Doing so may cause a failure, malfunctions, injuries, or a fire.

- Do not drop or give a strong impact to the module since its case is made of resin.
  Doing so may damage the module.

- Before mounting the module to or removing it from the control panel, shut off all phases of the external power supply used by the entire system.
  Failure to do so may cause the module to fail or malfunction.

- The number of terminal block installations/removals is limited to 50 times or less. (IEC 61131-2 compliant)
  Exceeding the count of 50 may cause malfunctions.

- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

- When using any radio communication device such as a cellular phone, keep a distance of at least 25cm (9.85inch) away from the MELSEC-ST system in all directions.
  Failure to do so may cause malfunctions.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

REVISIONS

* The manual number is given on the bottom left of the back cover.

Print Date	* Manual Number	Revision
Apr., 2008	SH(NA)-080754ENG-A	First edition

Japanese Manual Version SH-080748-A

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INTRODUCTION

Thank you for choosing the ST1H-BT MELSEC-ST CC-Link head module.
Before using the module, please read this manual carefully to fully understand the functions and performance of the ST1H-BT MELSEC-ST CC-Link head module and use it correctly.

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8.2.2 Error code read request (Command No.: 8101H/0101H) •••••••

About Manuals

The following manuals are related to this product.
Please place an order if necessary.

Relevant Manuals

Manual Name	Manual Number (Model Code)
MELSEC-ST System User's Manual Describes the system configurations of the MELSEC-ST system, performance specifications, functions, handling, wiring, and troubleshooting of power distribution modules, base modules, and I/O modules. (Sold separately)	SH-080456ENG (13JR72)
GX Configurator-ST Version 1 Operating Manual Describes how to operate GX Configurator-ST, how to set the intelligent function parameters, and how to monitor the MELSEC-ST system. (Sold separately)	SH-080439ENG (13JU47)
CC-Link System Master/Local Module User's Manual Describes the system configurations, performance specifications, functions, handling, wiring, and troubleshooting of the QJ61BT11N. (Sold separately)	SH-080394E (13JR64)

Compliance with the EMC and Low Voltage Directives

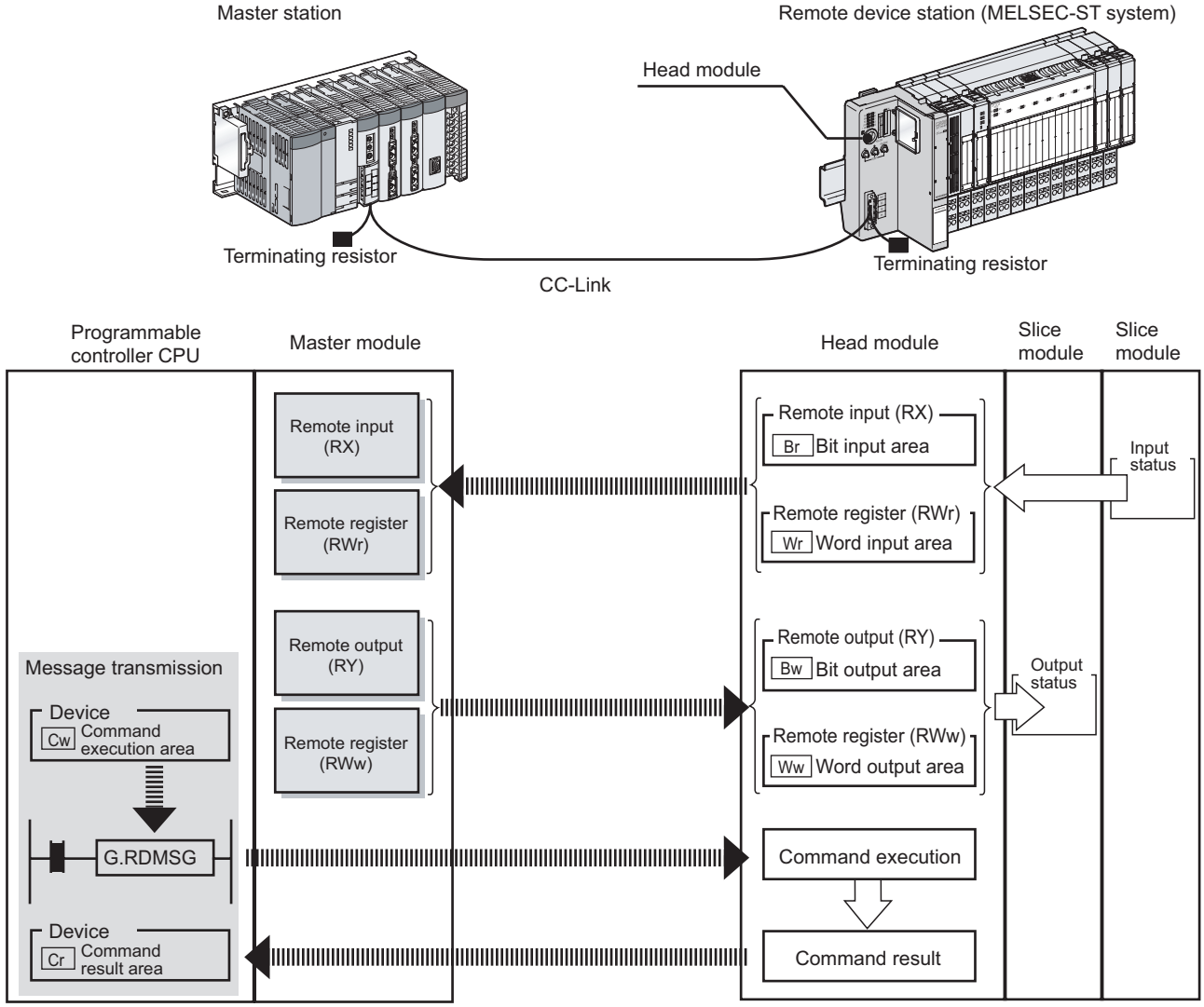
(1) For MELSEC-ST system

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi MELSEC-ST System (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 11 "EMC and Low Voltage Directive" in the MELSEC-ST System User's Manual.
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the MELSEC-ST system.

(2) For the product

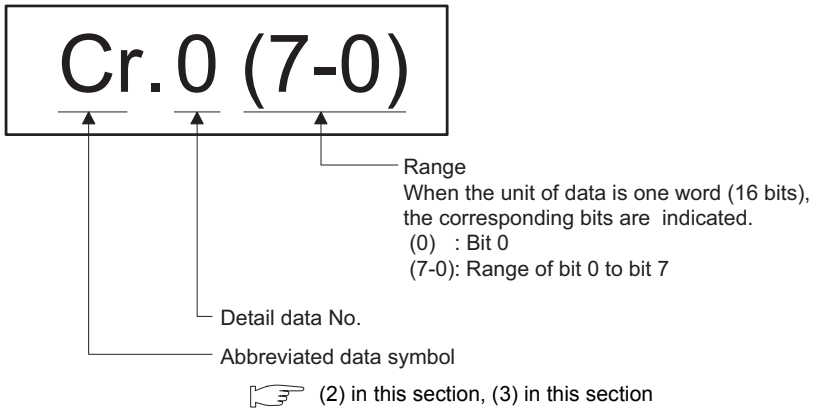
For the compliance of this product with the EMC and Low Voltage Directives, refer to Chapter 11 "EMC and Low Voltage Directives" in the MELSEC-ST System User's Manual.

In this manual, remote I/O, remote registers, and message transmission areas for CC-Link are represented with [Br], [Wr], [Cr], [Bw], [Ww], and [Cw].



(1) Data symbol

<Example of [Cr] Command result area>


Cr.0 (7-0)
Range
When the unit of data is one word (16 bits), the corresponding bits are indicated.
(0) : Bit 0
(7-0): Range of bit 0 to bit 7
Detail data No.
Abbreviated data symbol

(2) in this section, (3) in this section

(2) Head module → Master station

(a) Remote input (RX)

Data symbol		Area name	Unit	Detail data No. notation
Br	Br.00 to Br.n	Bit input area	1 bit/symbol	Hexadecimal

(b) Remote register (RWr)

Data symbol		Area name	Unit	Detail data No. notation
Wr	Wr.00 to Wr.n	Word input area	1 word/symbol	Hexadecimal

(c) Message transmission

Data symbol		Area name	Unit	Detail data No. notation
Cr	Cr.0 to Cr.n	Command result area	1 word/symbol	Decimal

(3) Master station → Head module

(a) Remote output (RY)

Data symbol		Area name	Unit	Detail data No. notation
Bw	Bw.00 to Bw.n	Bit output area	1 bit/symbol	Hexadecimal

(b) Remote register (RWw)

Data symbol		Area name	Unit	Detail data No. notation
Ww	Ww.00 to Ww.n	Word output area	1 word/symbol	Hexadecimal

(c) Message transmission

Data symbol		Area name	Unit	Detail data No. notation
Cw	Cw.0 to Cw.n	Command execution area	1 word/symbol	Decimal

Generic Terms and Abbreviations

Unless otherwise specified, this manual uses the following generic terms and abbreviations to explain the head module.

Generic term/ Abbreviation	Description
Head module	Abbreviation for the ST1H-BT MELSEC-ST CC-Link head module.
Bus refreshing module	Module that distributes external system power and auxiliary power to the head module and slice modules.
Power feeding module	Module that distributes external auxiliary power to slice modules.
Power distribution module	Generic term for the bus refreshing module and power feeding module.
Base module	Generic term for a module that transfers data between the head module and slice module, and between the slice module and external devices (including wiring).
Input module	Generic term for modules that handle input data in units of bits.
Output module	Generic term for modules that handle output data in units of bits.
Intelligent function module	Generic term for modules that handle input/output data in units of words.
I/O module	Generic term for input modules and output modules.
Slice module	Generic term for power distribution modules, I/O modules, and intelligent function modules that can be mounted on a base module.
MELSEC-ST system	Generic term for a system that is composed of a head module, slice modules, an end plate and end brackets.
GX Configurator-ST	Configuration software dedicated to the MELSEC-ST system. The general name of SWnD5C-STPB-E type products. (n=1 or later)
CC-Link	Abbreviation for Control & Communication Link system.
Master module	Abbreviation for the QJ61BT11N used as a master station.
RDMSG	Generic term for G.RDMSG and GP.RDMSG.

Term definition

The following explains the meanings and definitions of the terms used in this manual.

Term	Description
Cyclic transmission	A communication method by which remote I/O data and remote register data are transferred periodically.
Message transmission	A transmission method for writing parameters from the master station to a remote device station and reading the remote device station status.
Master station	This station controls the entire data link system. One master station is required for one system.
Local station	A station that has a programmable controller CPU and can communicate with the master station and other local stations.
Remote I/O station	A remote station that can only use bit data. (Input from or output to external devices) (AJ65BTB1-16D, AJ65SBTB1-16D, etc.)
Remote device station	A remote station that can use both bit and word data. (Input from or output to external devices, analog data conversion) (ST1H-BT, AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64DAI, etc.)
Remote station	Generic term for remote I/O stations and remote device stations. Controlled by the master station.
SB	Link special relay (for CC-Link). Bit data that indicate the module operating status and data link status of the master/local station.
SW	Link special register (for CC-Link). Data in units of 16 bits, which indicate the module operating status and data link status of the master/local station.
RX	Remote input (for CC-Link). Bit data that are input from remote stations to the master station.
RY	Remote output (for CC-Link). Bit data that are output from the master station to remote stations.
RWr	Remote register (Read area for CC-Link). Data in units of 16 bits, which are input from remote device stations to the master station.
RWw	Remote register (Write area for CC-Link). Data in units of 16 bits, which are output from the master station to remote device stations.
Remote net Ver.1 mode	Select this mode when extended cyclic setting is not needed or when the QJ61BT11 is replaced with the QJ61BT11N.
Remote net Ver.2 mode	Select this mode when creating a new system with extended cyclic setting.
I/O data	Data transferred between the head module and the master station. Generic term for RX, RY, RWr, and RWw.
Br.n Bit input area	Bit input data of each module. Input data are sent from the head module to the master station through remote input (RX).
Bw.n Bit output area	Bit output data of each module. Output data are received from the master station to the head module through remote output (RY).
Wr.n Word input area	Word (16-bit) input data of an intelligent function module. Input data are sent from the head module to the master station through remote register (RWr).
Ww.n Word output area	Word (16-bit) output data of an intelligent function module. Output data are received from the master station to the head module through remote register (RWw).

Term	Description
Cr.n Command result area	Information that indicates a command result. This information is stored in Setting data (area starting from (D1)+1) of the dedicated instruction (RDMSG) of the master station.
Cw.n Command execution area	Information for executing a command. This information is stored in Setting data (area starting from (S2)+1) of the dedicated instruction (RDMSG) of the master station.
Number of occupied I/O points	The area, which is equivalent to the occupied I/O points, is occupied in Br Bit input area/Bw Bit output area.
Slice No.	The number assigned to every 2 occupied I/O points of each module. The numbers are assigned in ascending order, starting from "0" of the head module. (The maximum value is 127.) This is used for specifying a command execution target.
Slice position No.	The number that shows where the slice module is physically installed. The numbers are assigned in ascending order, starting from "0" of the head module. (The maximum value is 63.) This is used for specifying a command execution target.
Start slice No.	The start slice No. assigned to the head module and slice modules.
Command	Generic term for requests that are executed by the master station for reading each module's operation status, setting intelligent function module command parameters or various controls.
Command parameter	Generic term for parameters set in commands or GX Configurator-ST. All of the parameters set for the head module and slice modules are command parameters.
ST bus cycle time	Processing time for the head module to refresh the input or output status of each slice module.
RAS	Abbreviation for Reliability, Availability, and Serviceability. This term is used to express the overall usability of automation systems.

Packing List

The following is a packing list of the head module.

Model name	Product	Quantity
ST1H-BT	ST1H-BT MELSEC-ST CC-Link head module	1
ST1A-EPL	ST1A-EPL end plate	1
ST1A-EBR	ST1A-EBR end bracket	2
Terminating resistor	Terminating resistor 110Ω, 1/2W (brown, brown, brown) (Used for wiring of CC-Link dedicated cables or Ver1.10 compatible CC-Link dedicated cables)	1

CHAPTER1 OVERVIEW

This manual describes the specifications, functions, pre-operation procedures and troubleshooting of the ST1H-BT MELSEC-ST CC-Link head module (hereinafter referred to as the head module).
The head module is used to connect a MELSEC-ST system to CC-Link. (It operates as a remote device station on the CC-Link network.)

When applying a program example from this manual to the actual system, make sure to examine the applicability of the program and confirm that it will not cause system control problems.

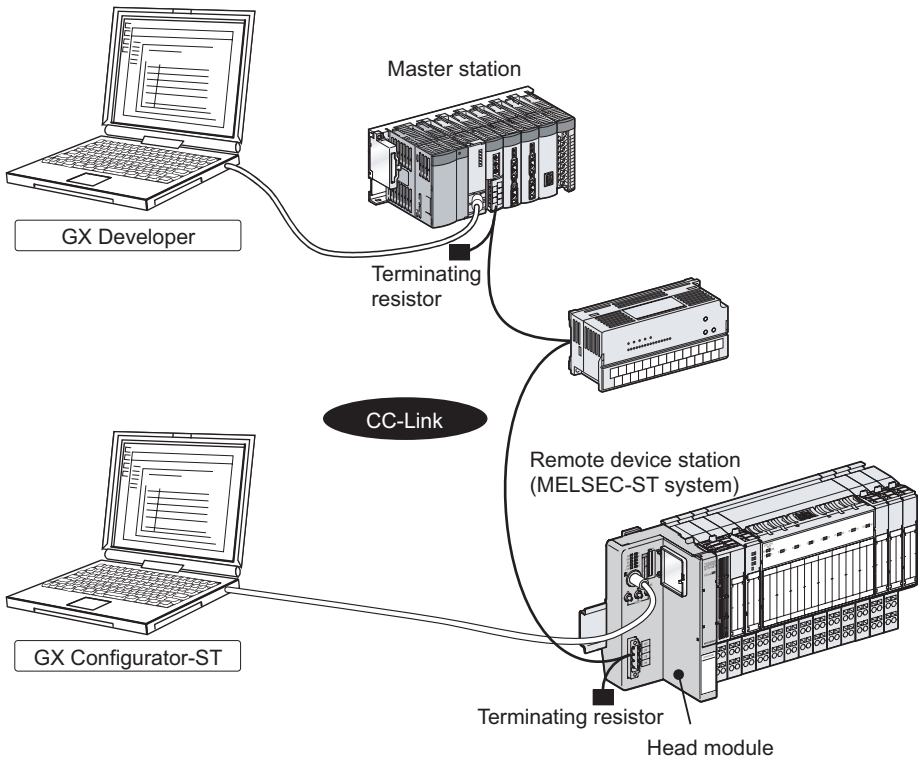


Figure 1.1 Head module overview

1.1 Features

The head module has the following features.

(1) Connecting MELSEC-ST system to CC-Link

Mounting this head module on a MELSEC-ST system allows connection of the MELSEC-ST system to CC-Link.

The head module communicates with the master station, operating as a remote device station on the CC-Link network. (☞ Section 4.2.1 Cyclic transmission function)

The head module supports Ver.2 remote device stations and Ver.1 remote device stations.

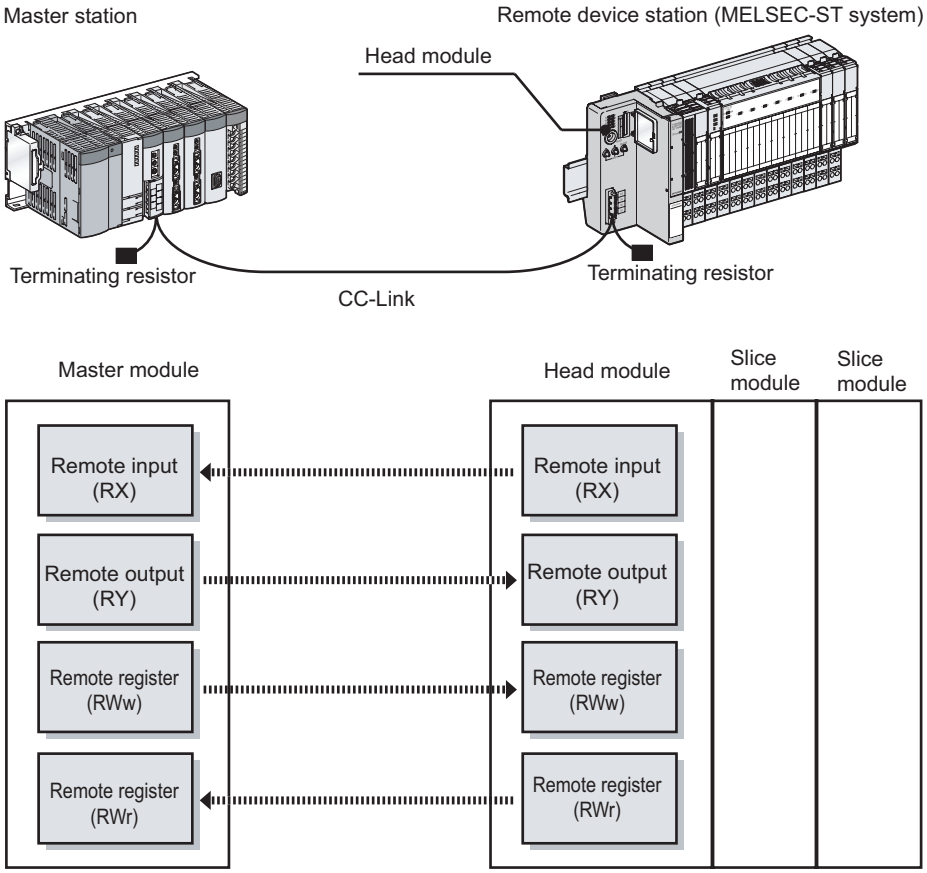


Figure 1.2 Connecting MELSEC-ST system to CC-Link

(2) Controlling MELSEC-ST system

(a) Control using I/O data

The MELSEC-ST system can be controlled with remote output (RY) and remote register (RWw) of CC-Link.

Also, input-status data and various information of the MELSEC-ST system can be sent to the master station using remote inputs (RX) and remote registers (RWr).

(☞ Section 4.2.1 Cyclic transmission function)

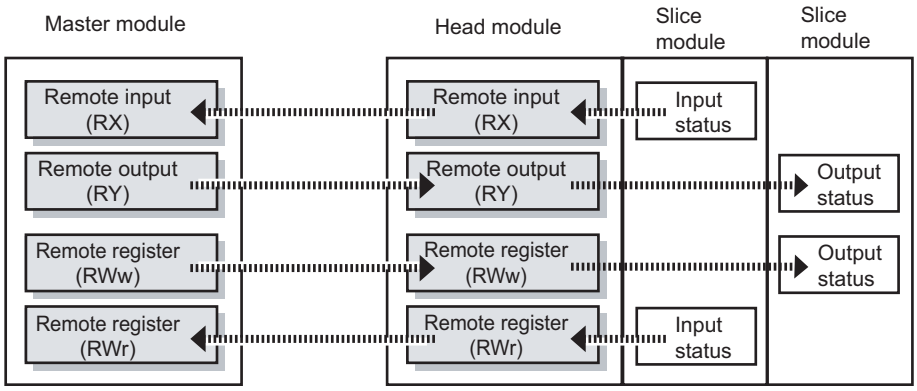


Figure 1.3 MELSEC-ST system control

(b) Up to 63 slice modules can be mounted

A maximum of 63 slice modules (up to 26 intelligent function modules*1) can be mounted to the head module.

* 1 The number of mountable modules differs depending on the intelligent function module. For details, refer to the following manual.

☞ Manual for the intelligent function module

(c) Commands are executable from the master station (The message transmission function is supported.)

The head module supports the message transmission function of CC-Link.

With the message transmission function (master station's dedicated instruction (RDMSG)), commands can be executed to the head module.

The following setting or checking is available with respective commands.

- Checking the operating status of the head module and each slice module
- Checking the mounting status of each slice module
- Reading error information of the head module and each slice module
- Reading an error code of the head module or each slice module
- Reading error history of the head module
- Setting command parameters of the head module and each slice module, etc.

(d) Output status for a module error can be set

For the case where an error occurs in a slice module, whether to stop or continue the refresh of outputs to other normal slice modules can be specified.

(☞ Section 4.3.1 Output status setting for module error)

(3) Using GX Configurator-ST

Using a separately available GX Configurator-ST, operations such as parameter setting, system monitoring, forced output test, or online module change can be performed easily. (☞ Section 2.1 Applicable Systems, GX Configurator-ST Operating Manual)

GX Configurator-ST is connected to the RS-232 interface connector of the head module.

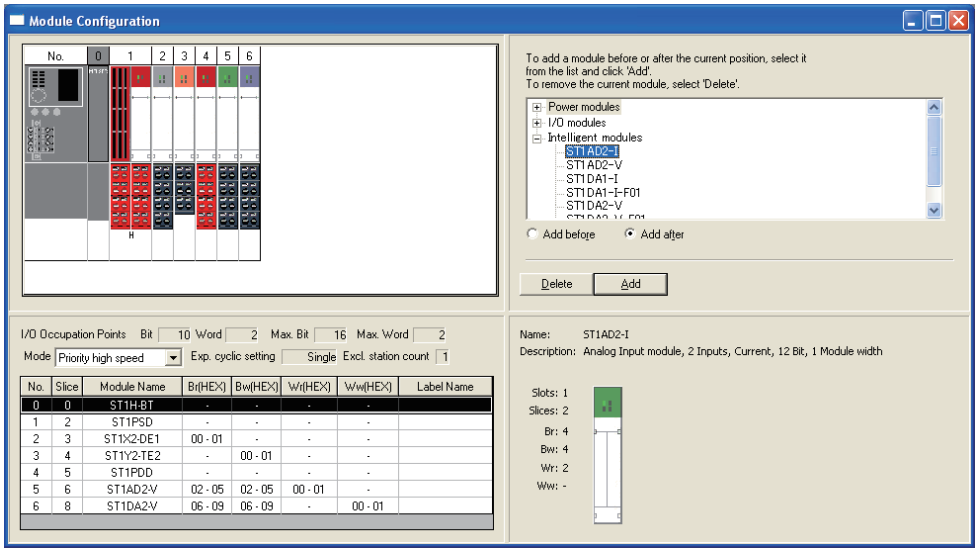

Module Configuration
No. 0 1 2 3 4 5 6
To add a module before or after the current position, select it from the list and click 'Add'.
To remove the current module, select 'Delete'.
Power modules
I/O modules
Intelligent modules
ST1AD2-I
ST1AD2-V
ST1DA1-I
ST1DA1-I-F01
ST1DA2-V
Add before
Add after
Delete
Add
I/O Occupation Points Bit 10 Word 2 Max. Bit 16 Max. Word 2
Mode Priority high speed Exp. cyclic setting Single Excl. station count 1
No. Slice Module Name Br(HEX) Bw(HEX) Wr(HEX) Ww(HEX) Label Name
0 0 ST1H-BT
1 2 ST1PSD - - - -
2 3 ST1X2-DE1 00 - 01 - - -
3 4 ST1Y2-TE2 - 00 - 01 - -
4 5 ST1PDD - - - -
5 6 ST1AD2-V 02 - 05 02 - 05 00 - 01 -
6 8 ST1DA2-V 06 - 09 06 - 09 - 00 - 01
Name: ST1AD2-I
Description: Analog Input module, 2 Inputs, Current, 12 Bit, 1 Module width
Slots: 1
Slices: 2
Br: 4
Bw: 4
Wr: 2
Ww: -

Figure 1.4 GX Configurator-ST

(4) Online module change

I/O modules and intelligent function modules can be replaced without stopping the MELSEC-ST system. (☞ Section 4.6 Online Module Change Function)

(5) Transmission speed auto-tracking

Transmission speed is automatically set according to the master module setting. No setting is needed for the head module side.

(6) Supporting CC-Link Ver.2.00

Supporting CC-Link Ver.2.00, the head module allows flexible system construction from a small-scale system to a large-scale system.

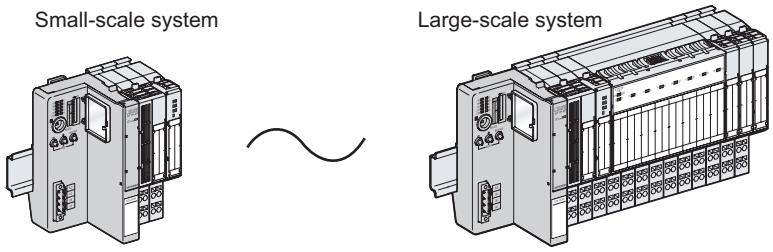


Figure 1.5 Flexible system construction

(7) Auto-optimizing number of occupied stations and extended cyclic setting

The head module can automatically optimizes the number of occupied stations and extended cyclic setting, according to the mounted slice modules and priority mode.*1(☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting)

The user does not need to calculate I/O points of the MELSEC-ST system to select the number of occupied stations and extended cyclic setting.

The results of the optimization are indicated by the LEDs of the head module. (☞ Section 5.3 (1) Operation indicator LEDs)

* 1 How to optimize the number of occupied stations and extended cyclic setting can be selected from the following:
· Giving priority to cyclic transmission speed
· Allowing connection of more remote stations to the CC-Link system (Reducing the number of occupied stations)

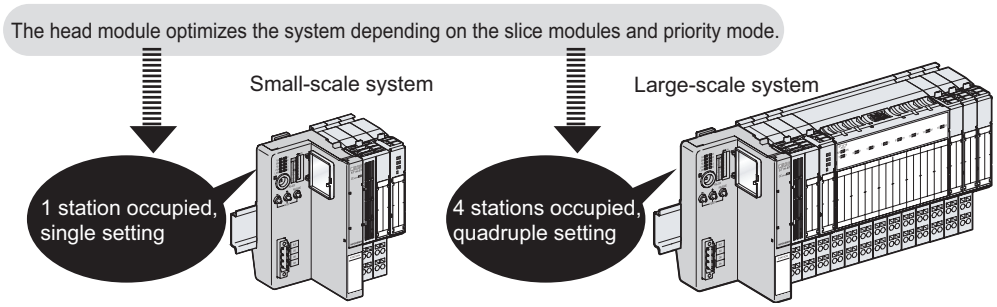

The head module optimizes the system depending on the slice modules and priority mode.
Small-scale system
Large-scale system
1 station occupied, single setting
4 stations occupied, quadruple setting

Figure 1.6 Optimization of No. of occupied stations and extended cyclic setting

CHAPTER2 SYSTEM CONFIGURATION

This chapter describes the system configuration for the head module.

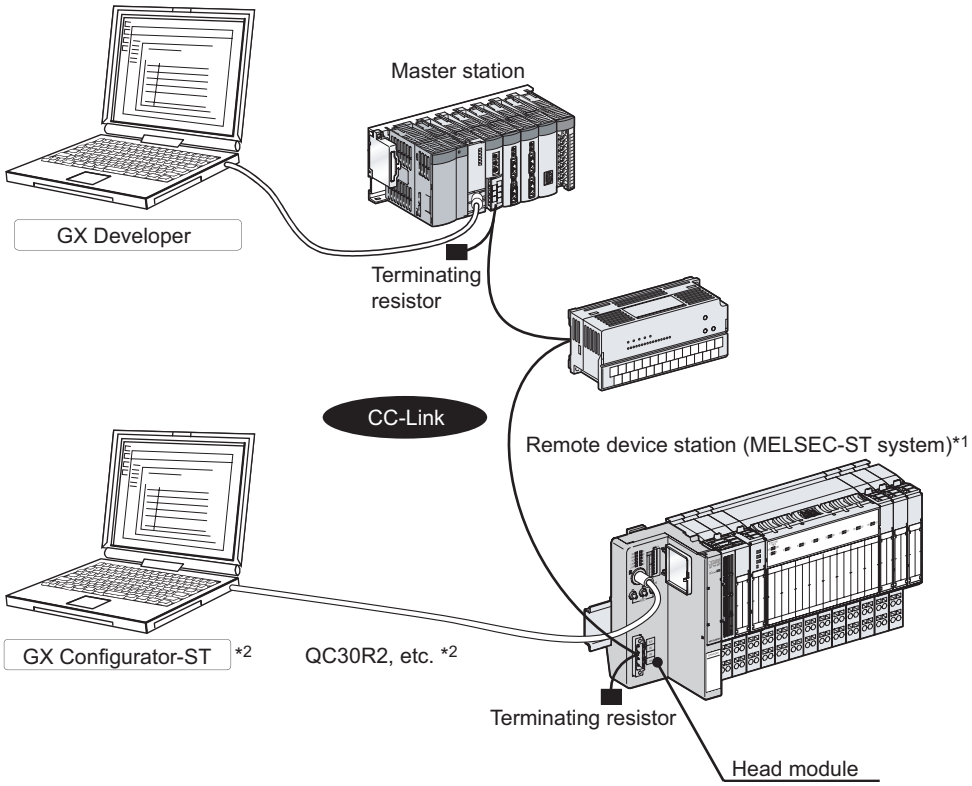


Figure 2.1 System configuration

* 1 For MELSEC-ST system configurations, refer to the following manual.
☞ MELSEC-ST System User's Manual
* 2 For system configurations using GX Configurator-ST, refer to the following manual.
☞ GX Configurator-ST Operating Manual

POINT

To use the head module as a Ver.1 remote device station, consider and modify the points of slice modules so that the extended cyclic setting is set to single. According to the points of the mounted slice modules, the head module automatically optimizes the extended cyclic setting.
☞ Section 4.2.2 (2) Priority modes in auto-optimization

Remark

CC-Link dedicated cables must be prepared by the user.(☞ Section 5.5.1 CC-Link dedicated cable wiring)

2.1 Applicable Systems

This section describes applicable systems.

(1) Applicable master module

To execute a command for the MELSEC-ST system by a dedicated instruction (RDMSG) of the master station, use a QJ61BT11N whose first five digits of serial No. is 10032 or greater.

Remark

Refer to the CC-Link Cable Wiring Manual issued by the CC-Link Partner Association.

(2) Supported software package

The software package usable for the head module is shown below.
GX Configurator-ST allows you to easily monitor the MELSEC-ST system. (GX Configurator-ST is optional.)

Table 2.1 Supported software package

Product name	Model name	Supported version
GX Configurator-ST	SWnD5C-STPB-E	Version 1.06G or later

CHAPTER3 SPECIFICATIONS

This chapter describes the performance specifications of the head module.
For the general specifications, refer to the following manual.
☞ MELSEC-ST System User's Manual

3.1 Performance Specifications

The performance specifications of the head module are provided below.

Table 3.1 Performance specifications

Item		Specification
CC-Link section		-
	CC-Link station type	Remote device station (Ver.2 or Ver.1 remote device station)
	Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps (Auto-detected by the head module)
	Number of occupied stations	1 to 4 stations By the points of the slice modules to be installed, the head module auto-optimizes the number of occupied stations. (☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting)
	Extended cyclic setting	Single, double, quadruple, or octuple setting By the points of the slice modules to be installed, the head module auto-optimizes the extended cyclic setting. (☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting)
	Max. points of I/O data used for CC-Link*1	•RX/RY: 448 points for each •RWw/RWr: 64 points for each (☞ Section 4.2.1 (2) Cyclic transmission data size)
	Connection cable*2	•CC-Link dedicated cable •Ver1.10 compatible CC-Link dedicated cable •CC-Link dedicated high-performance cable
MELSEC-ST system section		-
	Max. no. of slice modules	63 (Up to 26 intelligent function modules)*3
	Max. points of I/O data available for slice module control *1	• Br.n / Bw.n : 252 points for each • Wr.n / Ww.n : 52 points for each The maximum points for Br.n / Bw.n : reduce by two points for each additional power distribution module.
Head module section		-
	Number of occupied I/O points	0 point for each of input and output
	I/O points used in head module	• Br.n / Bw.n : 0 point for each • Wr.n / Ww.n : 0 point for each
	Number of occupied slices	2
	Terminal block	Spring clamp terminal block
	Applicable wire size	AWG #24 to #12, single wire: 0.5 to 1.78mm, stranded wire: 0.2 to 2.5mm^2
	Applicable solderless terminal	☞ Section 5.5.1 CC-Link dedicated cable wiring
	5V DC internal current consumption	0.41A
	External dimensions	114.5 (H) × 50.5 (W) × 74.5 (D)[mm]
	Weight	0.11kg

* 1 For the differences between the max. points of I/O data used for CC-Link and the max. points of I/O data available for slice module control, refer to the following.
☞ Section 4.2.1 (3) Example of cyclic transmission data sizes
* 2 Each type of Ver.1.00 compatible CC-Link dedicated cables, Ver.1.10 compatible CC-Link dedicated cables, and CC-Link dedicated high-performance cables must not be mixed.
If mixed, normal data transmission cannot be guaranteed.
Also, connect terminating resistors appropriate to the cable type.
* 3 The number of connectable modules differs depending on the occupied I/O points of the slice modules installed and the intelligent function module. (☞ Manual for the intelligent function module)

3.2 CC-Link Dedicated Cable Specifications

For CC-Link systems, use CC-Link dedicated cables.
The performance of the CC-Link system cannot be guaranteed when any other than CC-Link dedicated cables is used.
For more information, visit the following website.
☞CC-Link Partner Association website (http://www.cc-link.org/)

Remark

Refer to the CC-Link Cable Wiring Manual issued by the CC-Link Partner Association.

3.3 Communication between Master Station and MELSEC-ST System

The following I/O data are used for communication between the master station and MELSEC-ST system.

- Head module → Master station: Remote input (RX) and remote register (RWr)
- Master station → Head module: Remote output (RY) and remote register (RWw)

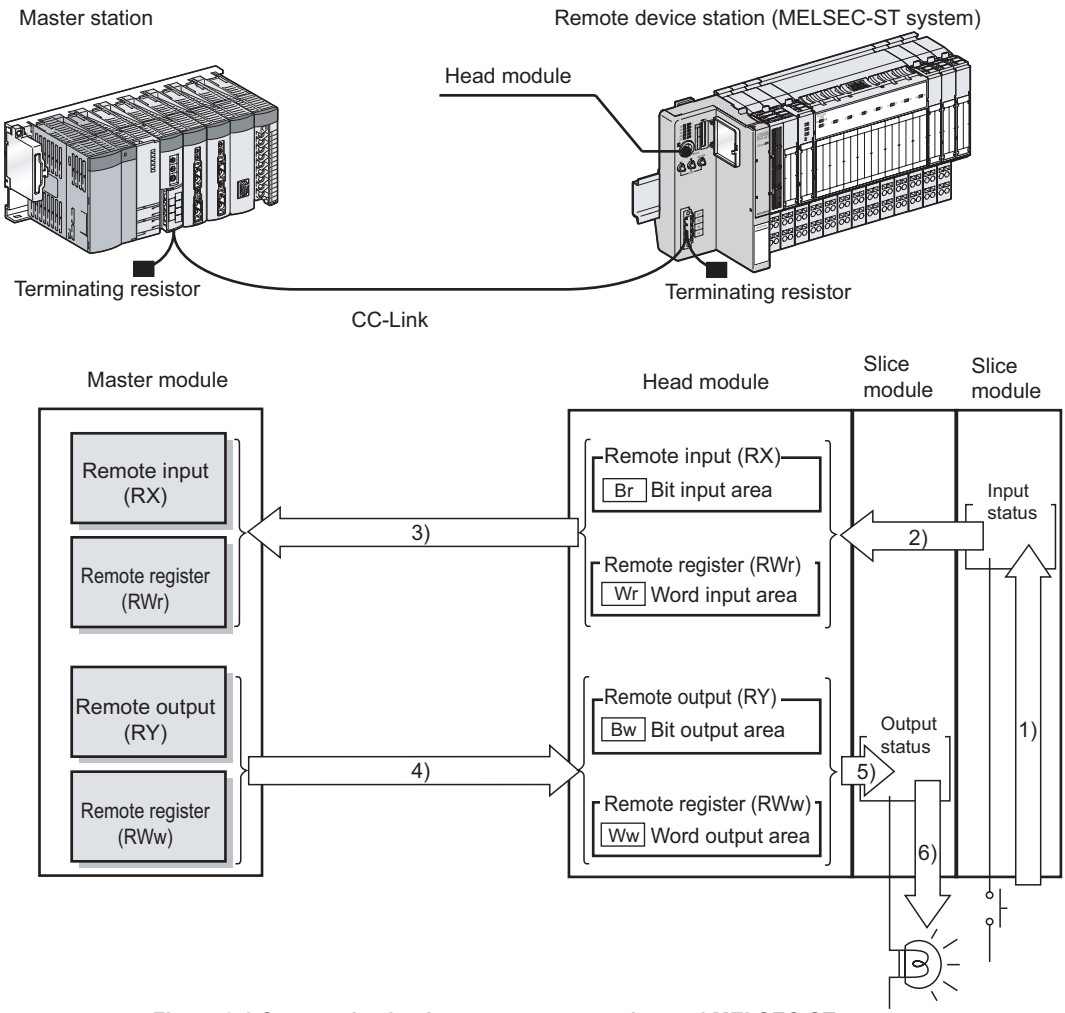


Figure 3.1 Communication between master station and MELSEC-ST system

(Processing summary for Head module → Master station)

1) The status data of the external device are loaded into the input status area of the slice module.
2) The input status of each slice module is stored into Br Bit input area and Wr Word input area of the head module.
3) Data in Br Bit input area and Wr Word input area are sent to remote input (RX) and remote register (RWr) of the master module.

(Processing summary for Master station → Head module)

4) Data in remote output (RY) and remote register (RWw) are received in Bw Bit output area and Ww Word output area of the head module.
5) Received data in Bw Bit output area and Ww Word output area are refreshed into the output status area of each slice module.
6) The output status data of the slice module is output to the external device.

Remark

For details of each area, refer to the following.
☞ Section 3.4 Remote I/O, Remote Registers

3.4 Remote I/O, Remote Registers

This section describes the remote I/O and remote registers of the head module.

3.4.1 List of remote I/O signals

(1) Configuration of remote I/O signals

Remote I/O signals are configured as shown below.

(a) Configuration of remote input signals

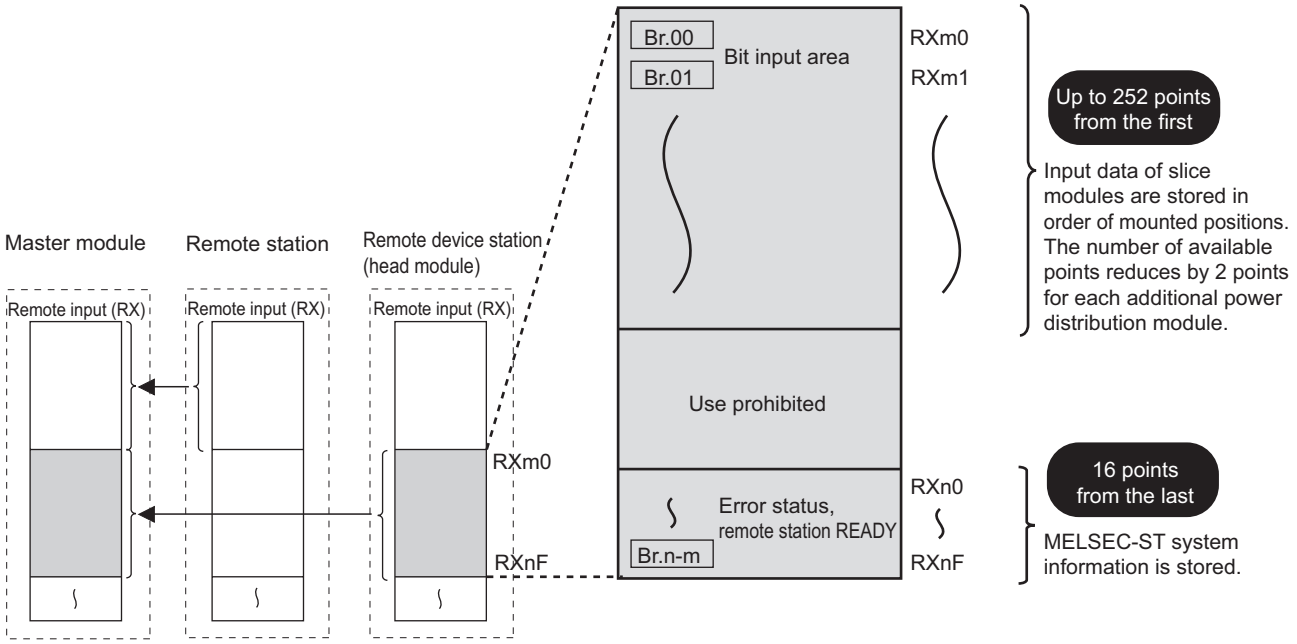


Figure 3.2 Configuration of remote input signals

(b) Configuration of remote output signals

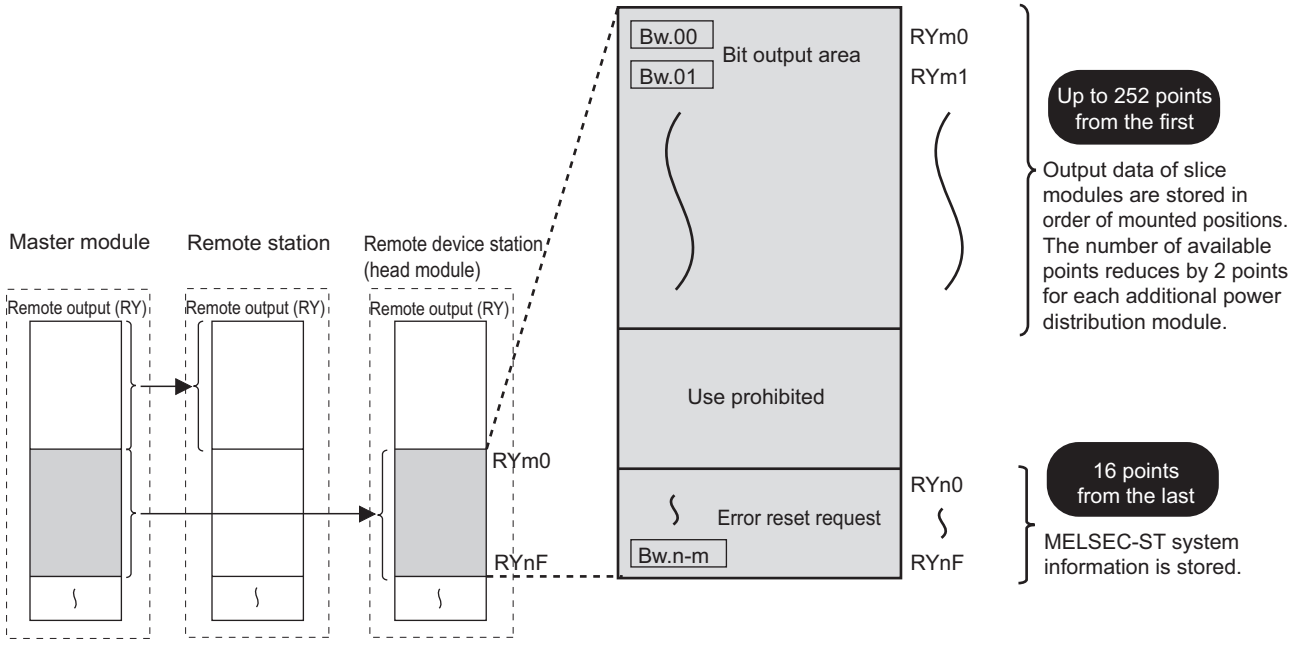


Figure 3.3 Configuration of remote output signals

(2) List of remote I/O signals

Remote input (RX) represents signals input from the head module to the master module.
Remote output (RY) represents signals output from the master module to the head module.
Lists of remote I/O signals are shown below.

(a) Up to 252 points from the first

Data in Br Bit input area and Bw Bit output area of the slice module are stored.
The number of available points reduces by 2 points for each additional power distribution module.

Table 3.2 List of remote I/O signals (up to 252 points from the first)

Signal direction: Head module→Master module		Signal direction: Master module→Head module	
Device No.	Signal name	Device No.	Signal name
RXm0 (Br.00)	Input area	RYm0 (Bw.00)	Output area
RXm1 (Br.01)		RYm1 (Bw.01)	
:		:	

(b) 16 points from the last

The MELSEC-ST system information is stored.

Table 3.3 List of remote I/O signals (16 points from the last)

Signal direction: Head module→Master module		Signal direction: Master module→Head module	
Device No.	Signal name	Device No.	Signal name
RXn0 (Br.(n-m)0)	Use prohibited	RYn0 (Bw.(n-m)0)	Use prohibited
to		to	
RXn9 (Br.(n-m)9)		RYn9 (Bw.(n-m)9)	
RXnA (Br.(n-m)A)	Error status	RYnA (Bw.(n-m)A)	Error reset request
RXnB (Br.(n-m)B)	Remote station READY	RYnB (Bw.(n-m)B)	Use prohibited
RXnC (Br.(n-m)C)	Use prohibited	to	
to			
RXnF (Br.(n-m)F)		RYnF (Bw.(n-m)F)	

POINT

Do not output any "Use prohibited" remote I/O signal (do not set it to ON).
Doing so may cause the MELSEC-ST system to malfunction.

3.4.2 Remote I/O details

The following describes details of the remote I/O signals.

(1) Remote I/O signals assigned to the area of the first to up to 252-points

In the area of up to 252 points from the first, Br Bit input area and Bw Bit output area values of slice modules are stored. The number of available points reduces by 2 points for each additional power distribution module.

(a) Input area (from RXm0)(from "Br.00")

The Br Bit input area states of input modules and intelligent function modules are stored.

1) Assignment order
The area is assigned in order of mounted positions of input modules and intelligent function modules.

2) Points occupied
This area occupies the points assigned to the Br Bit input areas for input modules and intelligent function modules.

3) Assignment example
Slice modules are mounted as shown below in the following assignment example.
The remote input (RX) of the head module are assumed to be RX40 to RX7F.

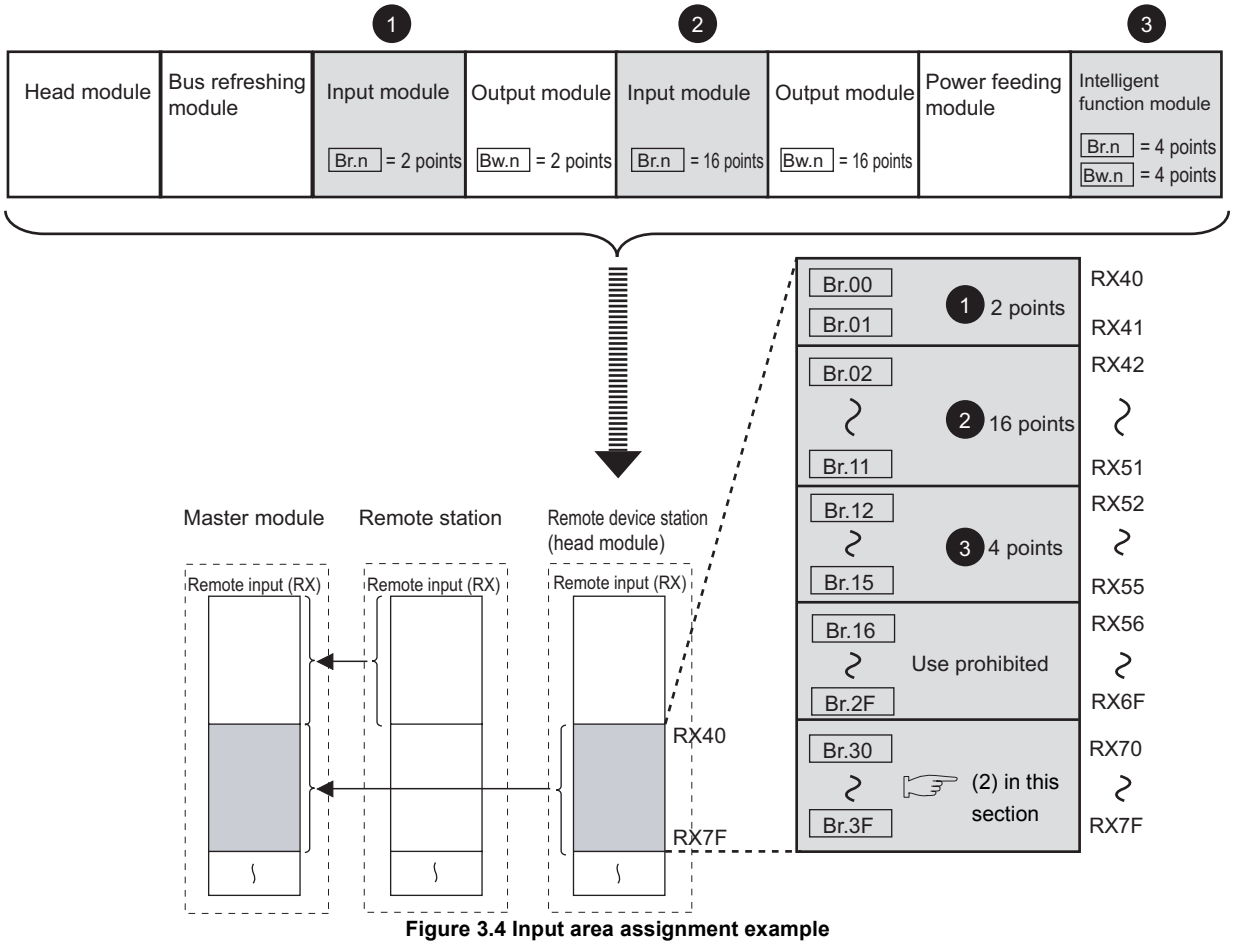


Figure 3.4 Input area assignment example

(b) Output area (from RYm0)(from "Bw.00")

The Bw Bit output area states of output modules and intelligent function modules are stored.

1) Assignment order
The area is assigned in order of mounted positions of output modules and intelligent function modules.

2) Points occupied

This area occupies the points assigned to the Bw Bit output area for output modules and intelligent function modules.

3) Assignment example
Slice modules are mounted as shown below in the following assignment example.
The remote output (RY) of the head module are assumed to be RY40 to RY7F.

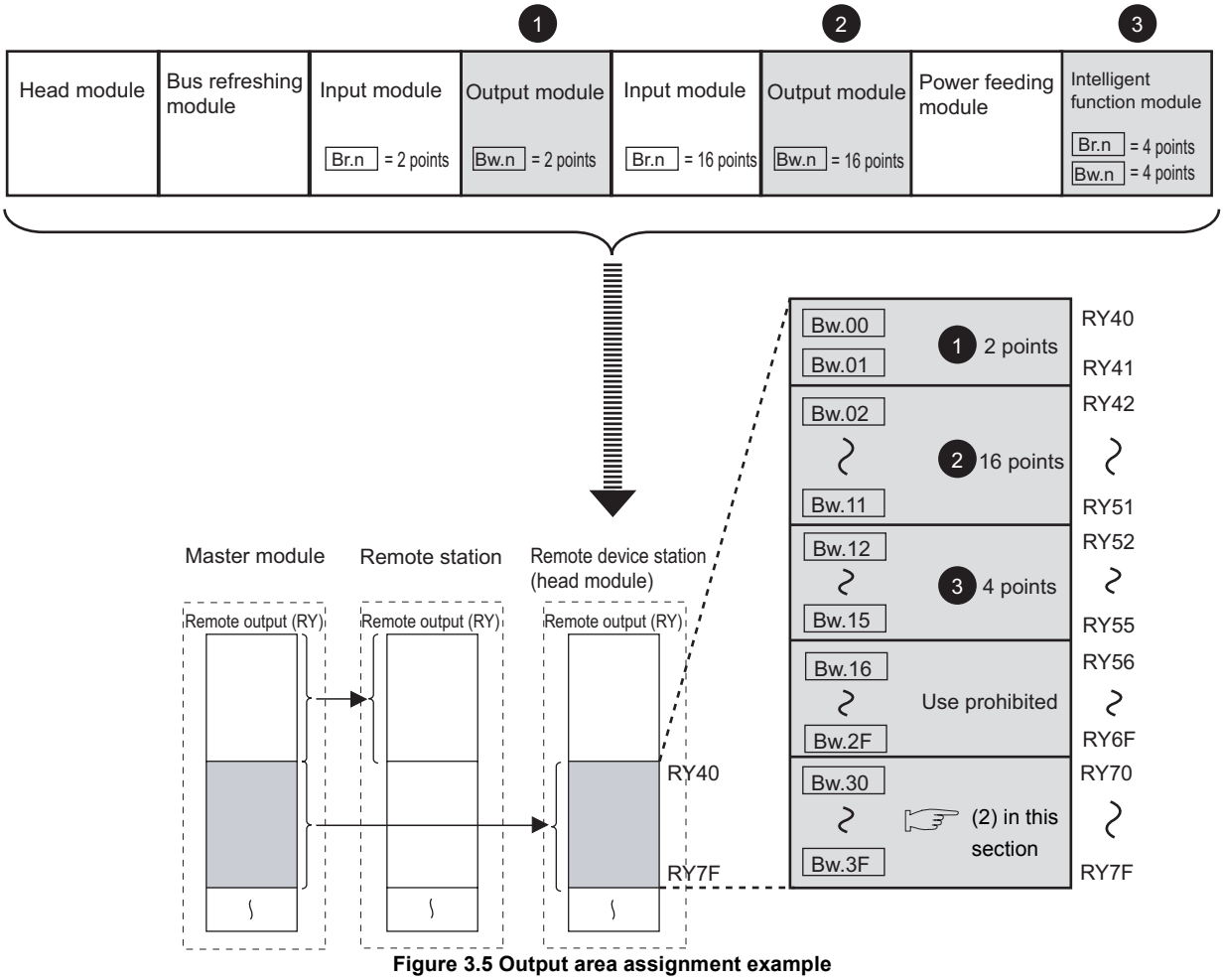


Figure 3.5 Output area assignment example

(2) Remote I/O signals assigned to the area of 16 points from the last

In the 16-point area from the last, MELSEC-ST system information is stored.

(a) Error status (RXnA)("Br.(n-m)A"), Error reset request (RYnA) ("Bw.(n-m)A")

1) When an error occurs, the conditions will change as follows:
   - Error status (RXnA)(Br.(n-m)A) is set to ON.
   - Remote station READY (RXnB)(Br.(n-m)B) is set to OFF.
   - The ERR. LED on the head module or a slice module turns on.

2) Read the error code, identify the error cause, and take action on the problem. (☞ Section 9.7.1 Reading error codes)

3) When the problem of the head module or a slice module is resolved, the conditions will change as follows:
   - Error status (RXnA)(Br.(n-m)A) is set to OFF.
   - Remote station READY (RXnB)(Br.(n-m)B) is set to ON.
   - The ERR. LED on the head module or a slice module turns off.

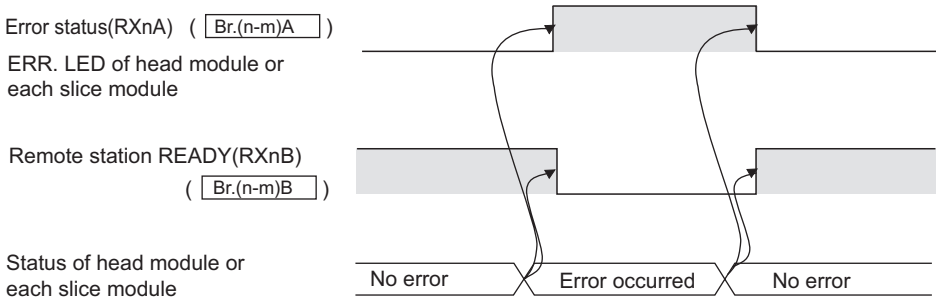

Error status(RXnA) (Br.(n-m)A)
ERR. LED of head module or each slice module
Remote station READY(RXnB) (Br.(n-m)B)
Status of head module or each slice module
No error
Error occurred
No error

Figure 3.6 Operation when an error occurs

4) When an error has occurred in the head module, even if the error is resolved, the conditions will not change as described in 3). (☞ Section 9.7.2 Error code list)
Set Error reset request (RYnA)(Bw.(n-m)A) to ON to reset the error.*2

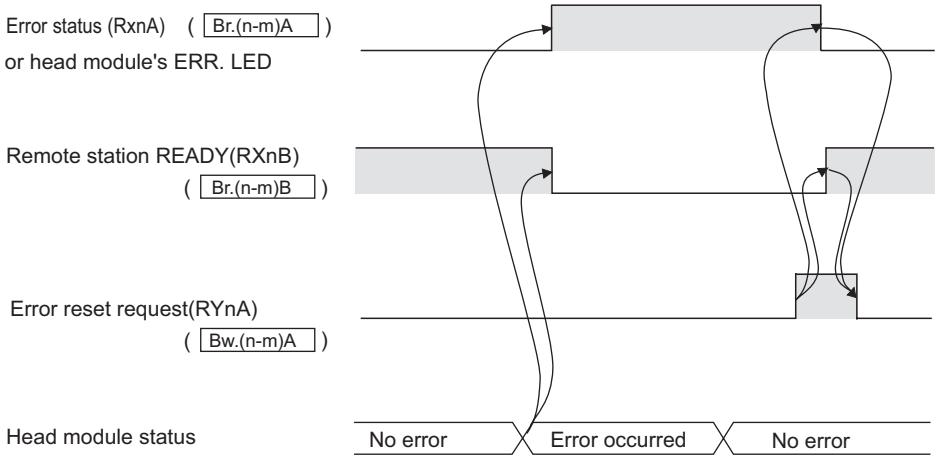


Figure 3.7 When an error has occurred in the head module

* 2 Slice module errors are cleared with Error clear request (command No.: 8104H/0104H).

(b) Remote station READY (RXnB)("Br.(n-m)B")

1) This signal is set to ON when the MELSEC-ST system becomes operable.

2) This is set to OFF when an error occurs and Error status (RXnA) (Br.(n-m)A) is set to ON.

For the behavior of Remote station READY (RXnB)(Br.(n-m)B), refer to the following.
☞ (2)(a) Error status (RXnA)("Br.(n-m)A"), Error reset request (RYnA) ("Bw.(n-m)A") in this section

3.4.3 Remote register list

(1) Configurations of remote registers

The remote registers are configured as described below.

(a) Configuration of remote register (RWr)

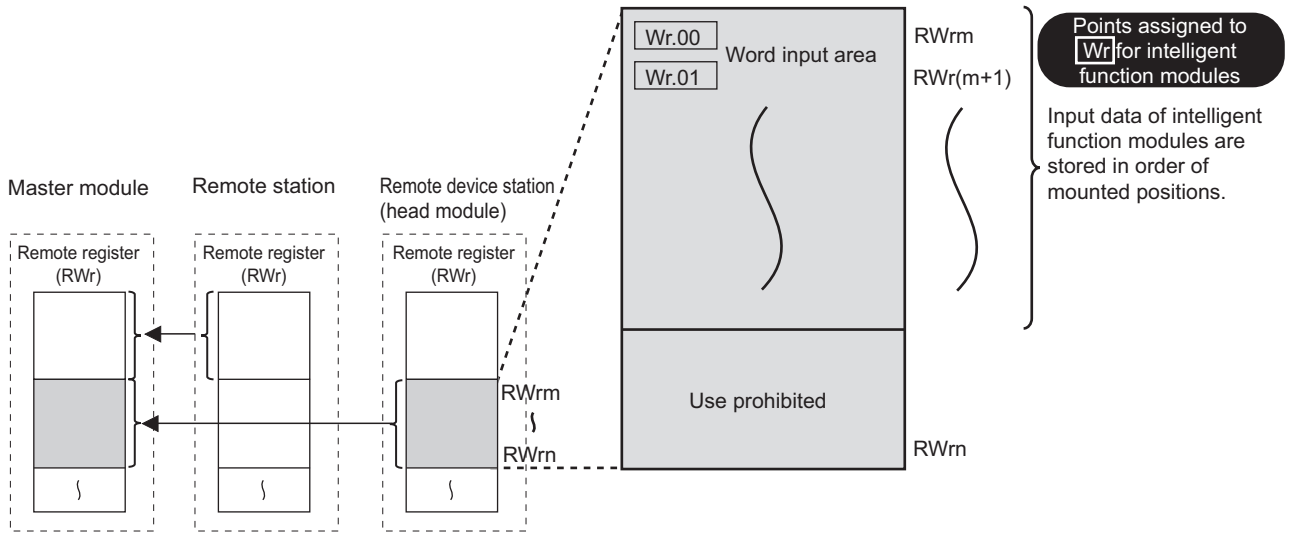


Figure 3.8 Configuration of remote register

(b) Configuration of remote register (RWw)

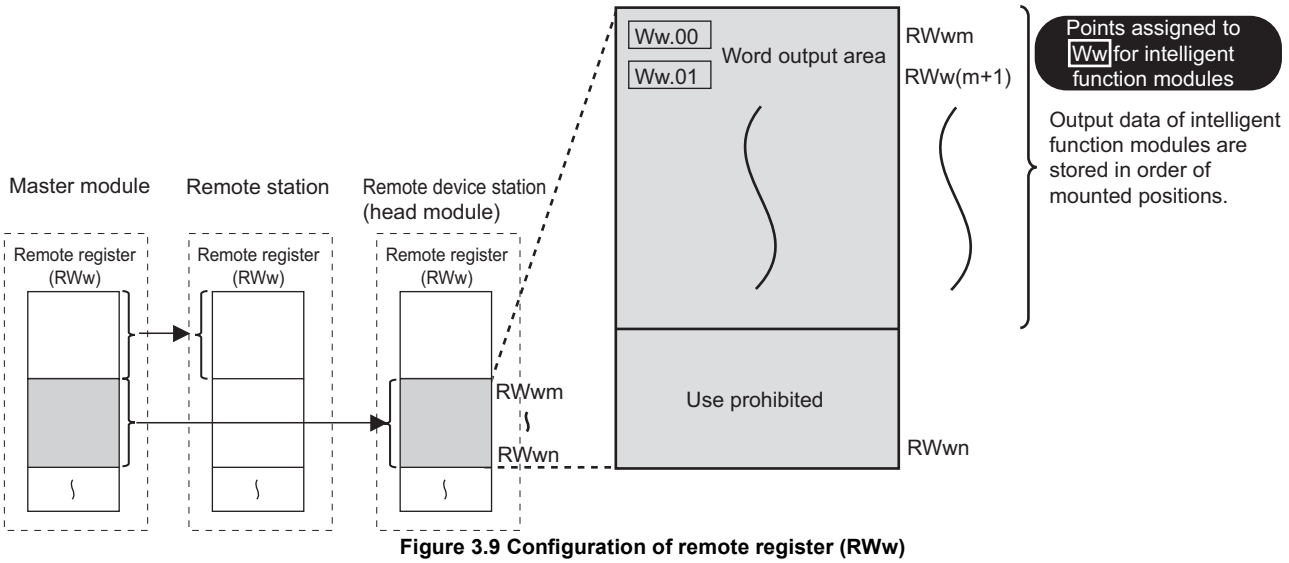


Figure 3.9 Configuration of remote register (RWw)

(2) Remote register list

Remote register (RWr) represents data sent from the head module to the master module.

Remote register (RWw) represents data sent from the master module to the head module.

The remote register list is shown below.

Table 3.4 Remote register list

Signal direction: Head module→ Master module		Signal direction: Master module→ Head module	
Device No.	**Signal name**	**Device No.**	**Signal name**
RWrm (Wr.00)	Intelligent function module area (for input)	RWwm (Ww.00)	Intelligent function module area (for output)
RWr(m+1) (Wr.01)		RWw(m+1) (Ww.01)	
to		to	
to	Use prohibited	to	Use prohibited
RWr(m+n) (Wr.n)		RWw(m+n) (Ww.n)	

POINT

Do not write data to the "Use prohibited" area.

Doing so may cause the MELSEC-ST system to malfunction.

3.4.4 Remote register details

This section describes details of the remote registers.

(1) Intelligent function module area (for input) (from RWrm) (from "Wr.00")

The Wr.n Word input area states of intelligent function modules are stored.

(a) Assignment order

The area is assigned in order of mounted positions of intelligent function modules.

(b) Points occupied

This area occupies the points assigned to the Wr.n Word input areas of intelligent function modules.

(c) Assignment example

Slice modules are mounted as shown below in the following assignment example. The remote register (RWr) of the head module are assumed to be RWr8 to RWrB.

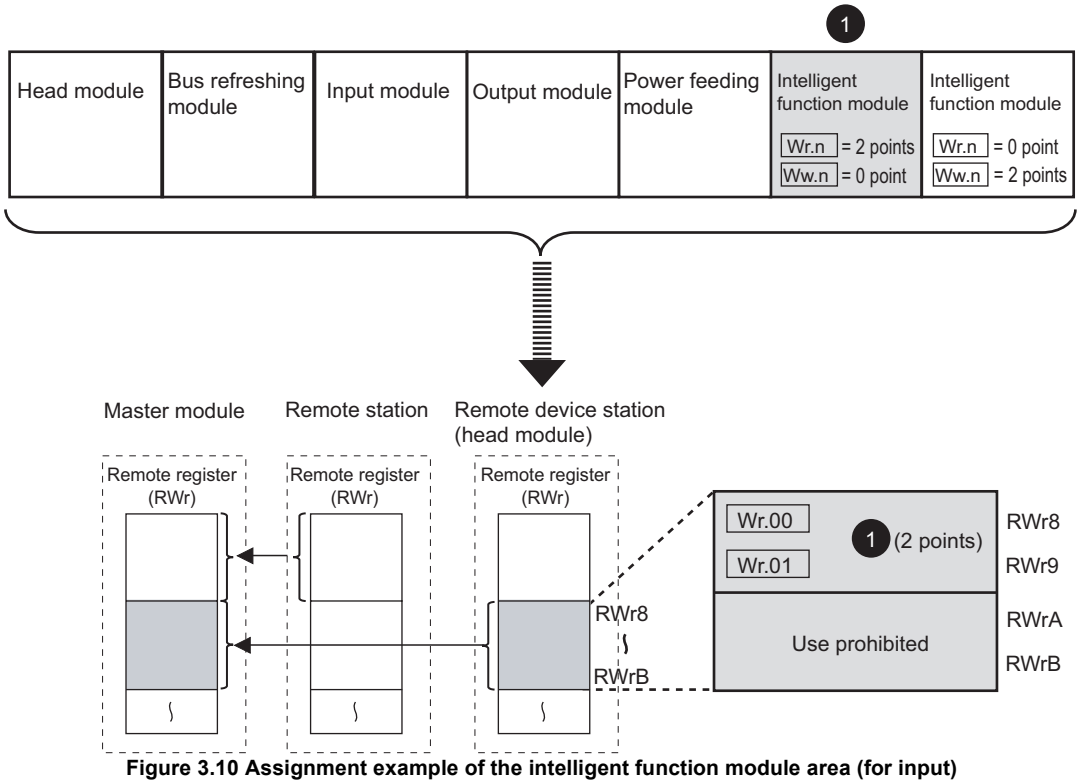


Figure 3.10 Assignment example of the intelligent function module area (for input)

(2) Intelligent function module area (for output) (from RWwm)(from "Ww.00")

The output states of intelligent function modules are stored.

(a) Assignment order

The area is assigned in order of mounted positions of intelligent function modules.

(b) Points occupied

This area occupies the points assigned to the Ww.n Word output areas of intelligent function modules.

(c) Assignment example

Slice modules are mounted as shown below in the following assignment example. The remote register (RWw) of the head module are assumed to be RWw8 to RWwB.

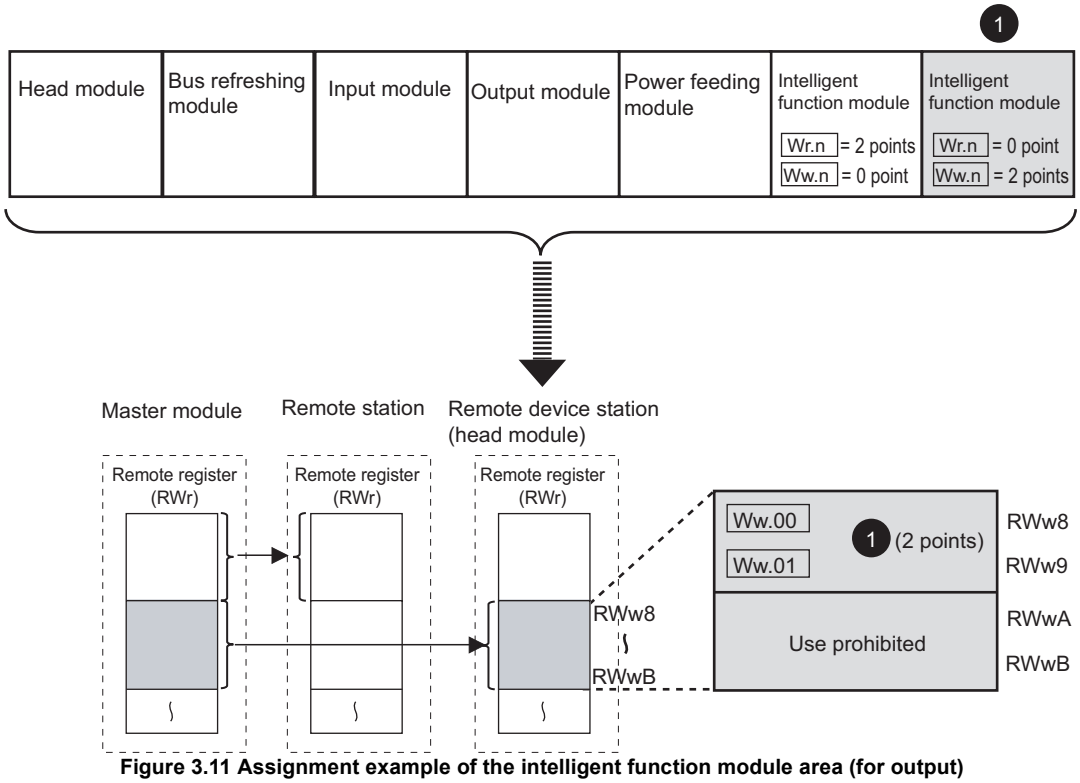


Figure 3.11 Assignment example of the intelligent function module area (for output)

3.5 Head Module Processing Time

This section describes the processing time of the head module used in the MELSEC-ST system.
Communication processings between the master station and MELSEC-ST system are indicated below.

(1) Processing summary for MELSEC-ST system → Master station

How input data from an external device is sent to the master station is shown below.

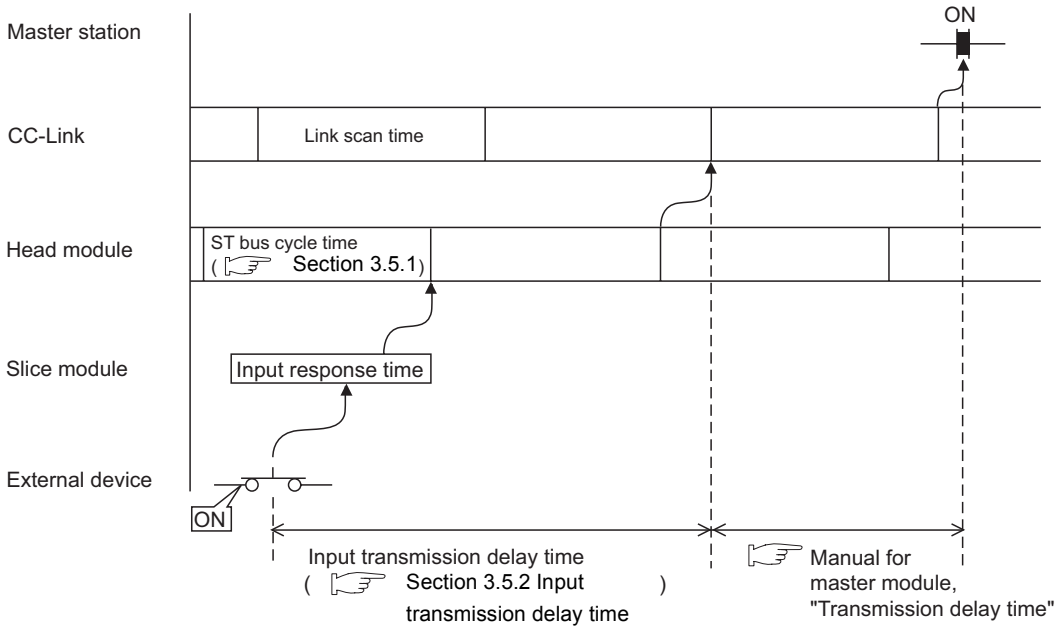


Figure 3.12 Processing of MELSEC-ST system → Master station

(2) Processing summary for Master station → MELSEC-ST system

How output data from the master station is output to an external device is shown below.

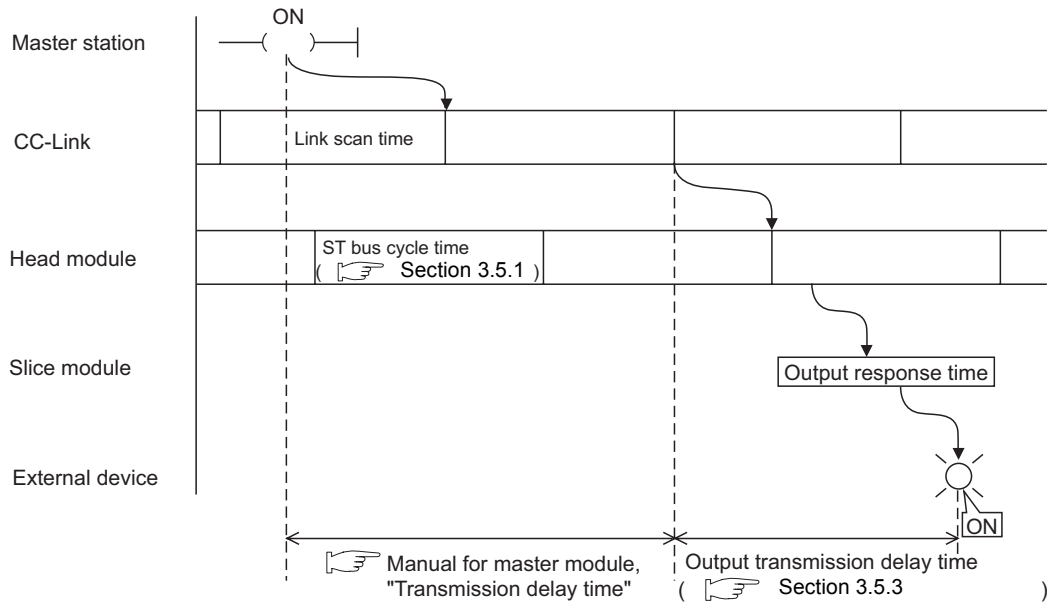


Figure 3.13 Processing of Master station → MELSEC-ST system

3.5.1 ST bus cycle time

ST bus cycle time is the processing time required for the head module to refresh I/O data for each slice module.
This section describes calculation formulas for ST bus cycle time and a processing time example.

(1) Calculation formulas for ST bus cycle time

The following is a calculation formula for ST bus cycle time.

ST bus cycle time [μ s] =

{44 × (① + ②)} + (157 × No. of intelligent function modules) + (Internal processing time)

[①, ②]

Calculate values for the above using the following formulas.

- When slice module(s) of 0 to 4 I/O points is mounted

  ① = No. of mounted slice modules that occupy 0 to 4 I/O points*1

  * 1 Include power distribution modules of 0 I/O points in the number of mounted slice modules.

- When slice module(s) of 5 or more I/O points is mounted

  ② = (Occupied I/O points ÷ 4) × (No. of mounted slice modules that occupy 5 or more I/O points)

<Example>

When the following slice modules are mounted, the value for ① + ② is shown below.

- Slice module of 0 I/O points: 1 module
- Slice module of 4 I/O points: 2 modules
- Slice module of 16 I/O points: 3 modules

① + ② = 3 + (16 ÷ 4) × 3= 15

[Internal processing time]

For the internal processing time, assign a value shown in the list below.

Table 3.5 Internal processing time

No. of occupied stations	Extended cyclic setting	Internal processing time	No. of occupied stations	Extended cyclic setting	Internal processing time
1 station occupied	Single setting	385 μ s	3 stations occupied	Single setting	415 μ s
	Double setting	385 μ s		Double setting	445 μ s
	Quadruple setting	400 μ s		Quadruple setting	520 μ s
	Octuple setting	430 μ s		Octuple setting	-
2 stations occupied	Single setting	400 μ s	4 stations occupied	Single setting	430 μ s
	Double setting	-		Double setting	475 μ s
	Quadruple setting	460 μ s		Quadruple setting	580 μ s
	Octuple setting	550 μ s		Octuple setting	-

- : Not used for head module

(2) Processing time example

The following system configuration example is used to explain a processing time example of ST bus cycle time.
(Table 3.6 uses data of the maximum I/O points setting sheet provided in Appendix 3.1.)

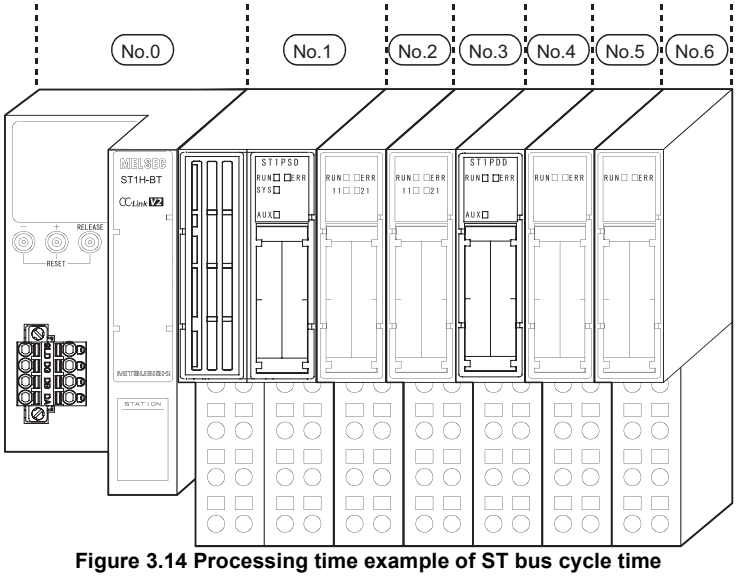


Figure 3.14 Processing time example of ST bus cycle time

Table 3.6 I/O points sheet

Slice position No.	Start slice No. (No. of occupied slices)	Module name	Br.n	Bw.n	Wr.n	Ww.n	5V DC internal current consumption (Total)	24V DC current (Total)	Slot width (Total)
0	0(2)	ST1H-BT	0	0	0	0	0.410A(0.410A)	0A(0A)	-
1	2(1)	ST1PSD	0	0	0	0	-	-	25.2mm (25.2mm)
2	3(1)	ST1X2-DE1	2	0	0	0	0.085A(0.495A)	*1	12.6mm (37.8mm)
3	4(1)	ST1Y2-TE2	0	2	0	0	0.090A(0.585A)	*1	12.6mm (50.4mm)
4	5(1)	ST1PDD	0	0	0	0	0.060A(0.645A)	-	12.6mm (63.0mm)
5	6(2)	ST1AD2-V	4	4	2	0	0.110A(0.755A)	*1	12.6mm (75.6mm)
6	8(2)	ST1DA2-V	4	4	0	2	0.095A(0.850A)	*1	12.6mm (88.2mm)
Total			10 (252 bits or less)*2	10 (252 bits or less)*2	2 (52 words or less)	2 (52 words or less)	-	-	88.2mm Total (850mm or less)

* 1 The 24V DC current varies depending on the external device connected to each slice module. Check the current consumption of the external device connected to each slice module, and calculate the total value. (MELSEC-ST System User's Manual)

* 2 The available points will decrease by two points for each additional power distribution module.

Number of mounted intelligent function modules: 2

Number of occupied stations: 1*3

Extended cyclic setting: Single setting*3

* 3 In the above system, the number of occupied stations and extended cyclic setting are optimized to 1 station occupied and single setting respectively. (☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting)

ST bus cycle time = {44 × (6 + 0)} + (157 × 2) + 385 ≒ 963 [μ s]

3.5.2 Input transmission delay time

This section explains the time taken from when a slice module receives input data from an external device until the module outputs the data to the CC-Link network.

(1) Average delay time

Input transmission delay time =

(Input response time) + (1.5 × ST bus cycle time)

[Input response time]

- For input modules
  Response time of an input module (☞ MELSEC-ST System User's Manual)
- For intelligent function modules
  Processing time of an intelligent function module (☞ Manual for the intelligent function module)

[ST bus cycle time]

☞ Section 3.5.1 ST bus cycle time

[Link scan time]

☞ Manual for the master module, "Link scan time"

(2) Maximum delay time

Input transmission delay time =

(Input response time) + (2.0 × ST bus cycle time) + (Link scan time)

[Input response time]

- For input modules
  Response time of an input module (☞ MELSEC-ST System User's Manual)
- For intelligent function modules
  Processing time of an intelligent function module (☞ Manual for the intelligent function module)

[ST bus cycle time]

☞ Section 3.5.1 ST bus cycle time

[Link scan time]

☞ Manual for the master module, "Link scan time"

3.5.3 Output transmission delay time

This section explains the time taken from when the head module receives output data from the master station until a slice module outputs the data to an external device.

(1) Average delay time

Output transmission delay time = (ST bus cycle time) + (Output response time)

[ST bus cycle time]

☞Section 3.5.1 ST bus cycle time

[Output response time]

- For output modules
  Response time of an output module (☞MELSEC-ST System User's Manual, "Output module specifications")
- For intelligent function modules
  Processing time of an intelligent function module (☞Manual for the intelligent function module)

(2) Maximum delay time

Output transmission delay time = (1.5 × ST bus cycle time) + (Output response time)

[ST bus cycle time]

☞Section 3.5.1 ST bus cycle time

[Output response time]

- For output modules
  Response time of an output module (☞MELSEC-ST System User's Manual, "Output module specifications")
- For intelligent function modules
  Processing time of an intelligent function module (☞Manual for the intelligent function module)

CHAPTER4 FUNCTIONS

This chapter describes the functions of the head module.

4.1 Function List

The functions of the head module are listed below.

(1) CC-Link functions

Table 4.1 CC-Link functions

Function	Description	Reference section
Cyclic transmission	Periodical data communications are performed between the master station and head module using RX, RY, RWr, and RWw of CC-Link.	Section 4.2.1
Auto-optimization of no. of occupied stations and extended cyclic setting	The head module optimizes the number of occupied stations and extended cyclic setting depending on the mounted slice modules.	Section 4.2.2
Transmission speed auto-tracking function	Transmission speed is automatically set according to the master module setting.	-
Consistency function	Integrity of cyclic data is ensured.	Section 4.2.3

(2) RAS functions

Table 4.2 RAS functions

Function	Description	Operation method			Reference section
		GX Configurator-ST	Command	Buttons or switches on head module	
Output status setting for module error	For the case where an error occurs in a slice module, this function allows setting of whether to stop or continue refreshing of the following data to other normal output modules and intelligent function modules. •Remote output (RY)(Bw.n Bit output area) •Remote register (RWw)(Ww.n Word output area)	×	○	×	Section 4.3.1

(3) Monitoring functions

Table 4.3 Monitoring functions

Function	Description	Operation method			Reference section
		GX Configurator-ST	Command	Buttons or switches on head module	
Information monitoring	Various information of the head module and slice modules can be monitored.	○	○	×	*1
Status monitoring	The operating status of each slice module and error history of the head module can be monitored.	○	○	×	Section 4.4.1
I/O data monitoring function	Data of [Br] Bit input area, [Bw] Bit output area, [Wr] Word input area, and [Ww] Word output area can be monitored.	○	×	×	*1

* 1 For GX Configurator-ST operations, refer to the following manual.
☞ GX Configurator-ST Operating Manual

(4) Test functions

Table 4.4 Test functions

Function	Description	Operation method			Reference section
		GX Configurator-ST	Command	Buttons or switches on head module	
Forced output test function	Slice module data in [Bw.n] Bit output area and [Ww.n] Word output area can be forcibly output.	○	×	×	*1
Self-diagnostic function	The head module can perform a hardware test by itself.	×	×	○	Section 5.4

* 1 For GX Configurator-ST operations, refer to the following manual.
☞ GX Configurator-ST Operating Manual

(5) Other functions

Table 4.5 Other functions

Function	Description	Operation method			Reference section
		GX Configurator-ST	Command	Buttons or switches on head module	
Reading/writing intelligent function module parameters	Parameters can be read from or written to the ROM or RAM of an intelligent function module.	○	○	×	Section 4.5
Online module change	I/O modules and intelligent function modules can be replaced without stopping the MELSEC-ST system.	○	×	○	Section 4.6
Reset function of head module	The MELSEC-ST system can be reset.	○	×	○	Section 5.3.3
Command execution	Commands requested by message transmission from the master station can be executed.	×	○	×	CHAPTER 8

4.2 CC-Link Functions

This section describes the functions of the head module used in CC-Link.

4.2.1 Cyclic transmission function

(1) About cyclic transmission function

This function allows periodical data communication between the master station and head module using RX, RY, RWr, and RWw of CC-Link.

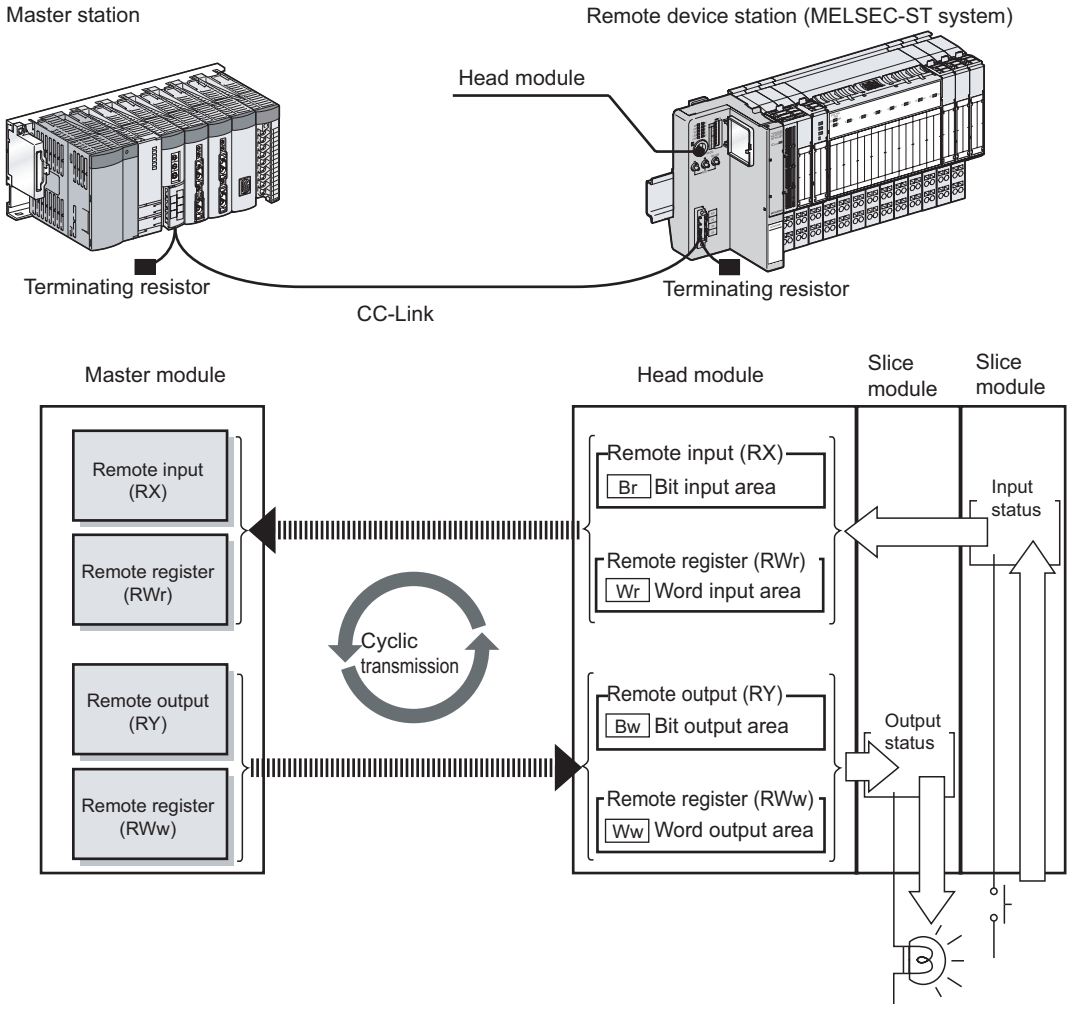


Figure 4.1 Cyclic transmission function

(2) Cyclic transmission data size

(a) I/O points available for slice module control
Using the following points, slice modules can be controlled.

Table 4.6 I/O points available for slice module control

Item	Point
Br.n Bit input area	Up to 252 points*1
Bw.n Bit output area	Up to 252 points*1
Wr.n Word input area	Up to 52 points
Ww.n Word output area	Up to 52 points

* 1 The available points will decrease by two points for each additional power distribution module.

Remark

(1) For I/O points, refer to the following.
☞ Section 5.2.1 Checking the MELSEC-ST system
(2) For details of each area, refer to the following.
☞ Section 3.4 Remote I/O, Remote Registers

(b) Points that the head module uses for CC-Link
Depending on the mounted slice module, the number of occupied stations and extended cyclic setting are automatically optimized. (☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting)
The following table shows cyclic transmission data sizes by combinations of the number of occupied stations and extended cyclic setting.

Table 4.7 Points that head module uses for CC-Link

Item		Extended cyclic setting			
		Single	Double	Quadruple	Octuple
1 station occupied	Remote I/O (RX, RY)	32 points	32 points	64 points	128 points
	Remote register (RWr, RWw)	4 points	8 points	16 points	32 points
2 stations occupied	Remote I/O (RX, RY)	64 points	-	192 points	384 points
	Remote register (RWr, RWw)	8 points	-	32 points	64 points
3 stations occupied	Remote I/O (RX, RY)	96 points	160 points	320 points	-
	Remote register (RWr, RWw)	12 points	24 points	48 points	-
4 stations occupied	Remote I/O (RX, RY)	128 points	224 points	448 points	-
	Remote register (RWr, RWw)	16 points	32 points	64 points	-

- : Not available for head module

(3) Example of cyclic transmission data sizes

This section gives an example of cyclic transmission data sizes used in the following system configuration.

(a) System configuration example

Table 4.8 System configuration example

No.	Module name	Bit		Word	
		Br.n	Bw.n	Wr.n	Ww.n
0	ST1H-BT	0	0	0	0
1	ST1PSD	0	0	0	0
2	ST1X2-DE1	2	0	0	0
3	ST1Y2-TE2	0	2	0	0
4	ST1PDD	0	0	0	0
5	ST1AD2-V	4	4	2	0
6	ST1AD2-V	4	4	2	0
7	ST1AD2-V	4	4	2	0
8	ST1AD2-V	4	4	2	0
13	ST1RD2	4	4	2	0
14	ST1RD2	4	4	2	0
15	ST1SS1	4	4	2	0
16	ST1SS1	4	4	2	0
Total		34	34	16	0

(b) Number of occupied stations and extended cyclic setting

In the above system configuration, the number of occupied stations and extended cyclic setting is as follows (When the mode switch is default):

- No. of occupied stations: 3 stations occupied
- Extended cyclic setting: Double setting

☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting

(c) Cyclic transmission data sizes

The data sizes are as shown below.

1) Remote input/output (RX, RY)

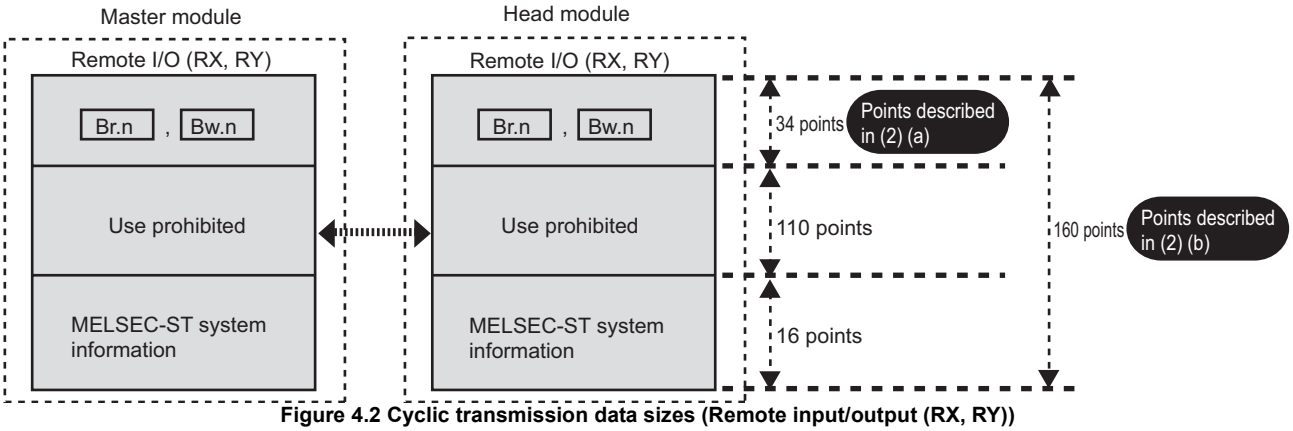


Figure 4.2 Cyclic transmission data sizes (Remote input/output (RX, RY))

2) Remote register (RWr)

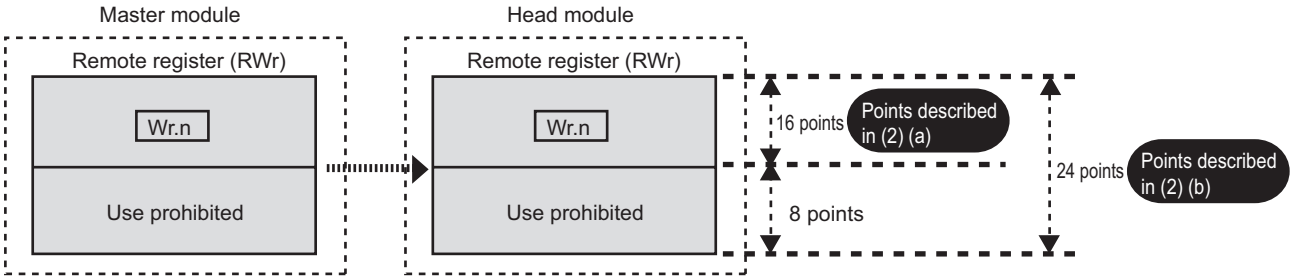


Figure 4.3 Cyclic transmission data sizes (Remote register (RWr))

Remark

For details of each area, refer to the following.

☞ Section 3.4 Remote I/O, Remote Registers

(4) Setting method

For the setting method, refer to the following.

☞ Section 5.3.1 Mode switch

4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting

(1) About the auto-optimization of no. of occupied stations and extended cyclic setting

The head module automatically optimizes the number of occupied stations and extended cyclic setting depending on the mounted slice modules.

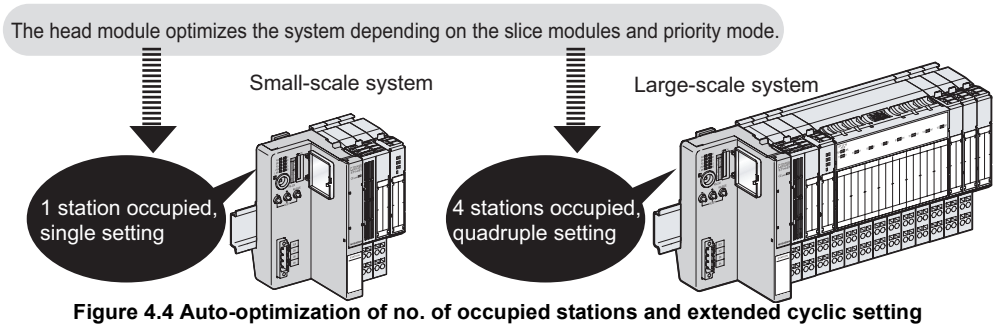

The head module optimizes the system depending on the slice modules and priority mode.
Small-scale system
Large-scale system
1 station occupied, single setting
4 stations occupied, quadruple setting

Figure 4.4 Auto-optimization of no. of occupied stations and extended cyclic setting

(2) Priority modes in auto-optimization

Priority high speed mode or Priority min. stations mode can be selected for optimization of the number of occupied stations and extended cyclic setting.

(a) Priority high speed mode

This mode gives priority to the cyclic transmission speed to set the number of occupied stations and extended cyclic setting.

The optimization will make the extended cyclic setting value smaller.

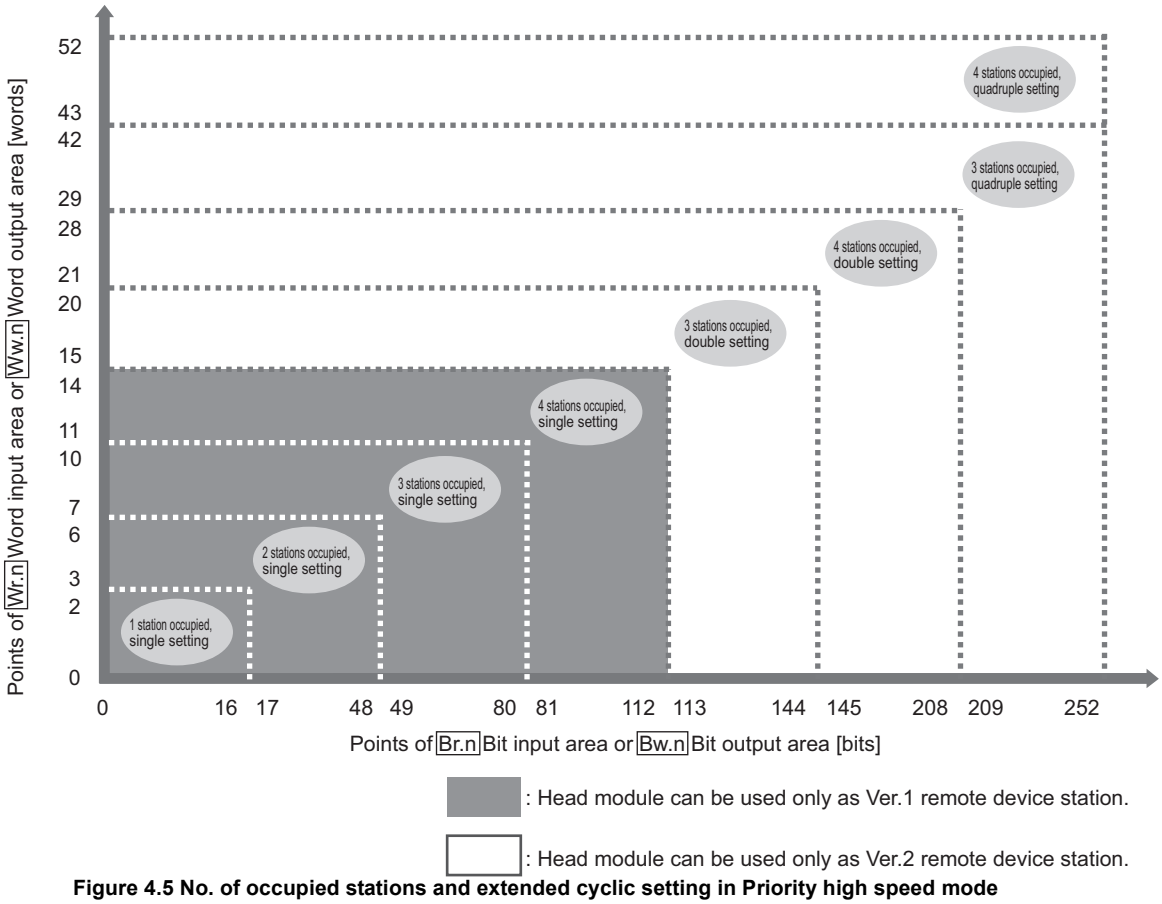


Figure 4.5 No. of occupied stations and extended cyclic setting in Priority high speed mode

(b) Priority min. stations mode

This mode optimizes the number of occupied stations and extended cyclic setting so that the number of remote stations connectable to the CC-Link system can be increased.

The optimization will reduce the number of occupied stations.

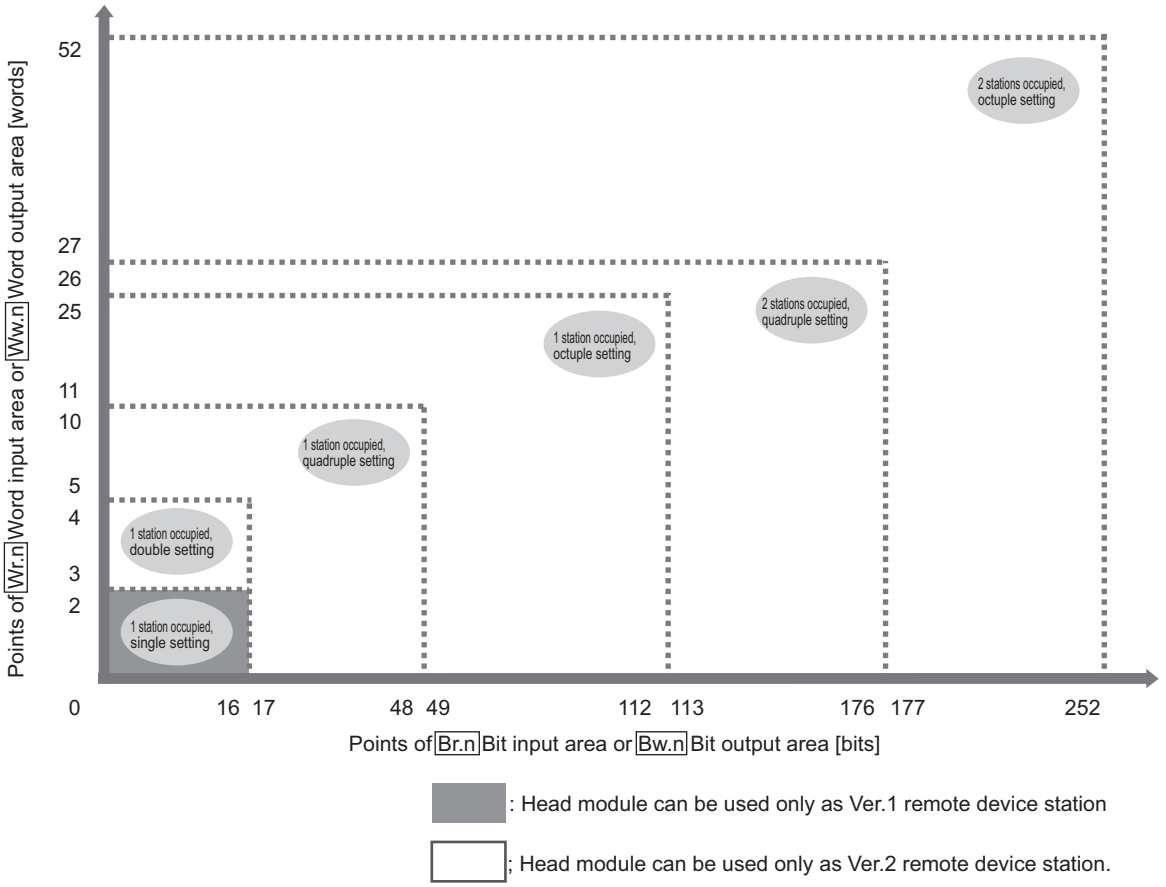


Figure 4.6 No. of occupied stations and extended cyclic settings in Priority min. stations mode

POINT

For a Ver.1 remote device station, use Priority high speed mode. (☞ (2)(a) Priority high speed mode in this section)

In Priority min. stations mode, only a combination of 1 station occupied and single setting is available for Ver.1 remote device stations.

(3) Setting method

For the setting method, refer to the following.

☞ Section 5.3.1 Mode switch

(4) Optimization example

An optimization example in the following system configuration is described below.

(a) System configuration example

Table 4.9 System configuration example

No.	Module name	Bit		Word	
		Br.n	Bw.n	Wr.n	Ww.n
0	ST1H-BT	0	0	0	0
1	ST1PSD	0	0	0	0
2	ST1X2-DE1	2	0	0	0
3	ST1Y16-TE2	0	16	0	0
4	ST1PDD	0	0	0	0
5	ST1AD2-V	4	4	2	0
6	ST1DA2-V	4	4	0	2
7	ST1TD2	4	4	2	0
Total		14	28	4	2

(b) Priority mode

Priority high speed mode is used.

(c) Optimization result

From the values of Br.n Bit input area and Bw.n Bit output area, the greater value of 28 points is used.

From the values of Wr.n Word input area and Ww.n Word output area, the greater value of 4 points is used.

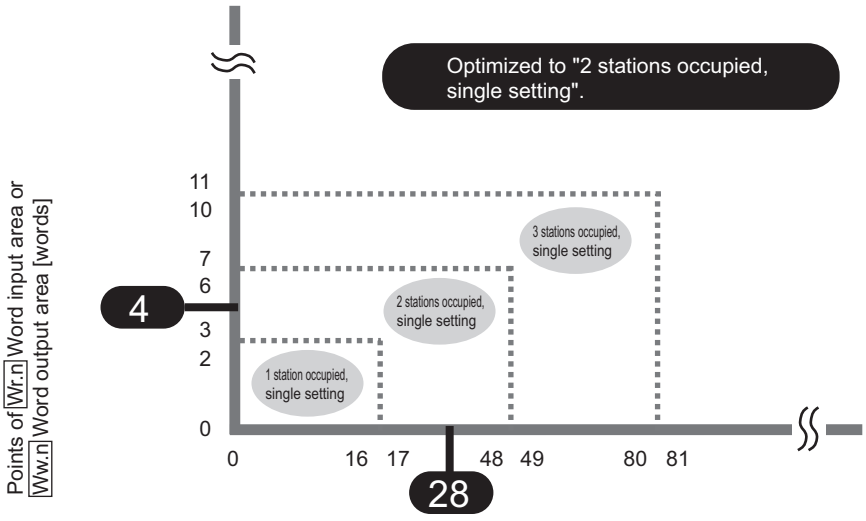


Figure 4.7 Optimization result

(5) Precautions

When using the head module as a Ver.1 remote device station, consider the point setting for slice modules so that the extended cyclic setting will be single setting.

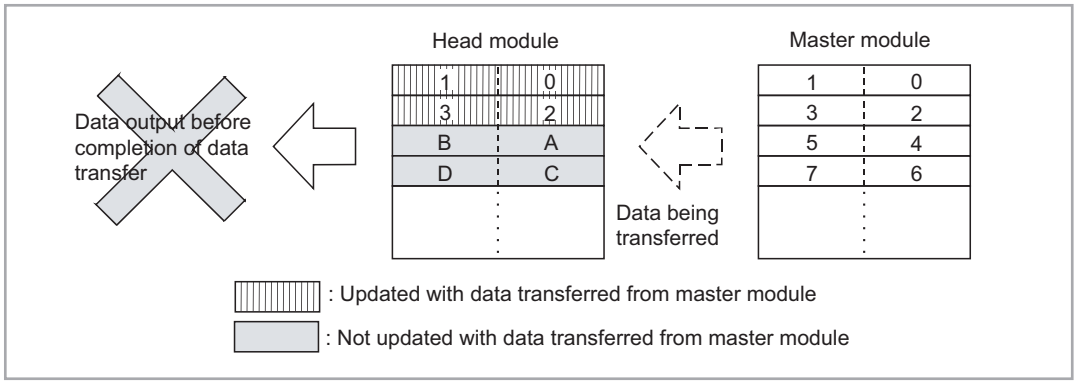
- Extended cyclic setting is single setting: Operates as a Ver.1 remote device station.
- Extended cyclic setting is double setting or more: Operates as a Ver.2 remote device station.

4.2.3 Consistency function

(1) About the consistency function

This function ensures cyclic data integrity.

When consistency function is disabled



When consistency function is enabled

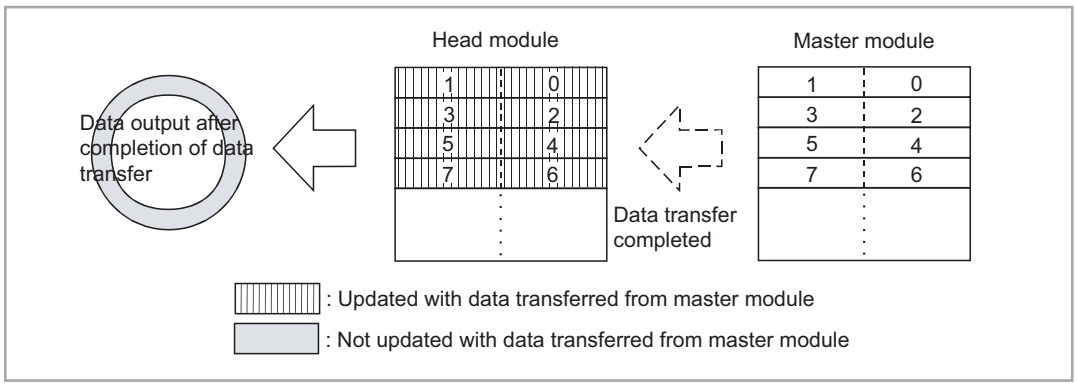


Figure 4.8 Consistency function

When an intelligent function module uses I/O data, enable the consistency function.

(2) Setting method

Perform the following setting.

(a) Master station side

Enable the Block guarantee of cyclic data per station.

(☞ Manual for the master module, "Guaranteeing the cyclic data for each slave station (block guarantee of cyclic data per station)")

(b) Head module side

With a command parameter of the head module, enable the consistency function.

1) Settings

Table 4.10 Consistency function (Command parameter of head module)

Item	Description
Enable (Default)	Ensures cyclic transmission data integrity.
Disable	Does not ensure cyclic transmission data integrity.

2) Setting method

Use a command for the setting.

☞ Section 8.2.7 Initial data batch write request (Command No.: 8106H), Section 8.2.8 Initial data individual write request (Command No.: 8107H/0107H)

POINT

Setting the consistency function to "Disable" will reduce intelligent function module control operation by one ST bus cycle time.

4.3 RAS Functions

This section describes the RAS functions of the head module.

4.3.1 Output status setting for module error

(1) About the output status setting for module error

For the case where an error occurs in a slice module (except power distribution modules), this function allows setting of whether to stop or continue refreshing of the following data to other normal output modules and intelligent function modules.

- Remote output (RY) (Bw.n Bit output area)
- Remote register (RWw) (Ww.n Word output area)

(2) Operating conditions for the output status setting for module error

This function is activated in the following cases:

- A slice module failed to respond due to a hardware fault.
- A slice module was illegally removed while the external power supply is ON.

(3) The I/O status after error occurrence

(a) When a CC-Link communication error has occurred between the master station and head module

The I/O states of normally operating slice modules are shown below.

Table 4.11 I/O status after error occurrence

Type	Slice module	I/O status of slice module (RUN LED flashing (at 1s intervals))
Output	Output module	Hold/Clear
	Intelligent function module	Hold/Clear/Preset*1
Input	Input module	Refresh*2
	Intelligent function module	

* 1 The I/O status differs depending on the status of Bw.n Bit output area before the error occurred. (Manual for the intelligent function module, "Combinations of various functions")

* 2 The I/O status on the master station side differs depending on the master station's network parameter (Data link disorder station setting).
(Manual for the master module, "Section 5.5 Station Status at Error Occurrence")

(b) When an error occurred in another slice module
The I/O states of normally operating slice modules are shown below.

Table 4.12 The I/O status when an error occurred in another slice module

Type	Slice module	I/O status of slice module	
		When "Stop" is selected*1 (RUN LED flashing (at 1s intervals)	When "Continue" is selected*1 (RUN LED ON)
Output	Output module	Hold/Clear*2	Refresh
	Intelligent function module	Hold/Clear/Preset*2*3	
Input	Input module	Refresh	Refresh
	Intelligent function module		

* 1 This is set for the head module. ((4) Setting method in this section)
* 2 If another slice module with an error is replaced with a normal one by online module change, the Clear/Hold/Preset is reset to the refresh status (the RUN LED is ON) upon completion of online module change.
* 3 The I/O status differs depending on the status of Bw.n Bit output area before the error occurred. (Manual for the intelligent function module, "Combinations of various functions")

POINT

(1) The output status of the slice module in which an error has occurred is the status set with a command parameter of each slice module.

(2) Remote input (RX) (Br.n Bit input area) and remote register (RWr) (Wr.n Word input area) continues refresh even if an error occurs in a slice module.

(4) Setting method

To use the output status setting for module error, set the output status parameter for module error for the head module.

(a) Setting items

Table 4.13 Setting items for the output status setting for module error

Item	Description	RUN LED of slice module
Stop (Default)	When a slice module is faulty, the following data of normally operating output modules and intelligent function modules are placed in the status set with a command parameter of each slice module *1. •Remote output (RY) (Bw.n Bit output area) •Remote register (RWw) (Ww.n Word output area)	Flashing (at 1s intervals)
Continue	When a slice module is faulty, the following data refresh of normally operating output modules and intelligent function modules are continued. •Remote output (RY) (Bw.n Bit output area) •Remote register (RWw) (Ww.n Word output area)	On

* 1 For command parameters of output modules and intelligent function modules, refer to the following manual.

☞ Manuals for the output module and intelligent function module

(b) Setting method

Set the output status for module error with a command parameter.

☞ Section 8.2.7 Initial data batch write request (Command No.: 8106H)
☞ Section 8.2.8 Initial data individual write request (Command No.: 8107H/0107H)

4.4 Monitoring Function

This section describes the monitoring function of the head module.

4.4.1 Status monitoring function

(1) About the status monitoring function

The operating status of each slice module and error history of the head module can be monitored with GX Configurator-ST.
Information of some items can be monitored using commands or I/O data.

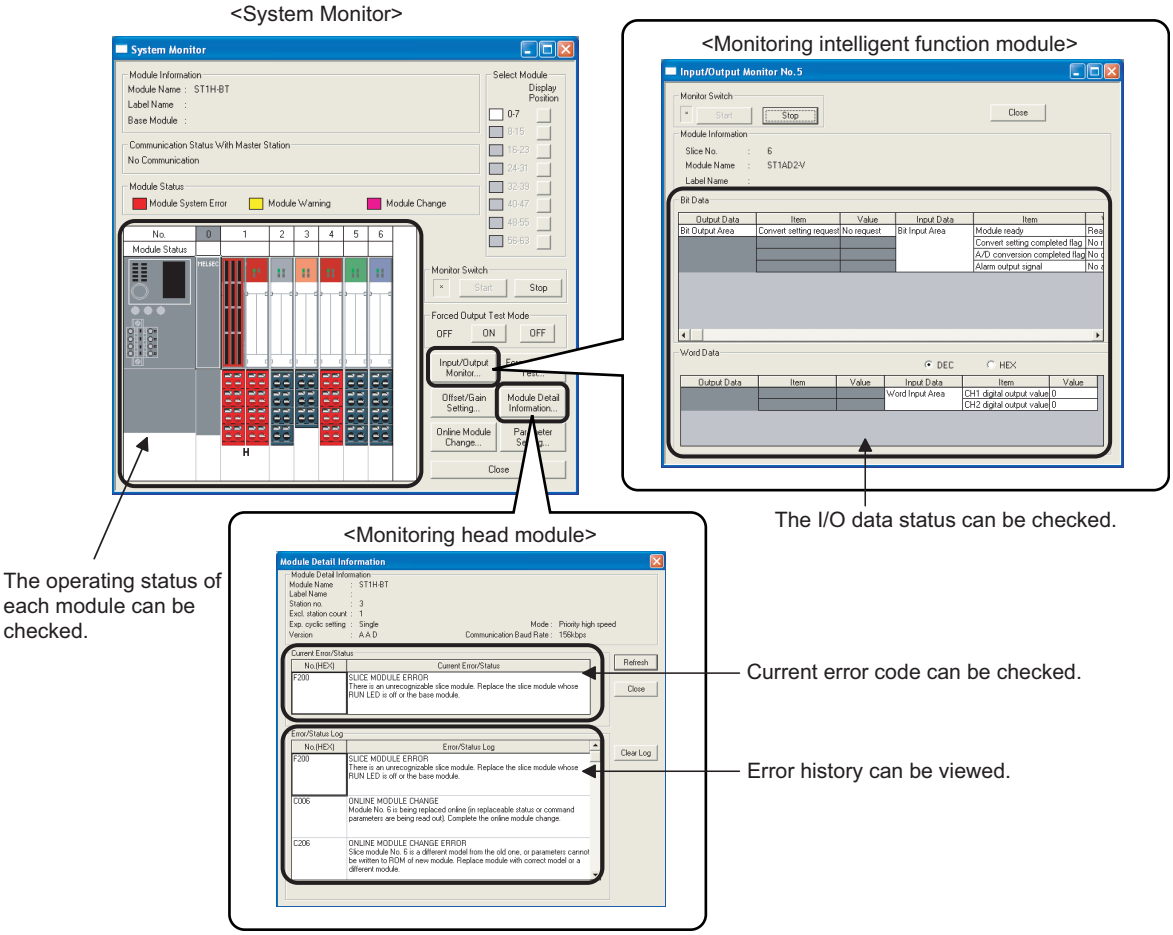


Figure 4.9 Status monitoring using GX Configurator-ST

Remark

For details of GX Configurator-ST, refer to the following manual.
☞ GX Configurator-ST Operating Manual

(2) Monitorable items

The following table lists a variety of information that can be monitored with the status monitoring function.

Table 4.14 Monitorable items

Item	Monitoring method		
	GX Configurator-ST	Check by I/O data	Command
Status of [Br] Bit input area, [Bw] Bit output area, [Wr] Word input area, and [Ww] Word output area)	○	○	×
Installation status of each module		×	○
Presence/absence of an error in MELSEC-ST system		○	×
Identification of slice No. corresponding to an error		×	○
Error code for error occurred in each module		×	○
Error history of head module		×	○

○ : Monitorable, × : Not monitorable

4.5 Reading/Writing Intelligent Function Module Parameters

(1) About reading and writing intelligent function module parameters

Command parameters can be read from or written to the ROM or RAM of an intelligent function module.

(2) Parameter reading or writing operation

To read or write command parameters from or to an intelligent function module, use either of the following.

(a) GX Configurator-ST
Read or write command parameters with GX Configurator-ST.

(b) Commands
Execute a command with a dedicated instruction (RDMSG) of the master station to read or write command parameters.
The command to be used varies depending on the set command parameters.

Remark

For details, refer to the following manual.
☞ Manual for the intelligent function module

4.6 Online Module Change Function

(1) About the online module change function

I/O modules and intelligent function modules can be replaced without stopping the MELSEC-ST system.

Online module change is executable by operating the buttons on the head module or from GX Configurator-ST.

4.6.1 Precautions for online module change

The following are the precautions for online module change.

(1) System configuration in which online module change is executable

To perform the online module change, the system configuration must be appropriate for execution of the online module change. (☞ MELSEC-ST System User's Manual, "Precautions for System Configuration")

Executing the online module change in an inappropriate system configuration may result in a malfunction or failure.

In a system configuration where online module change is not allowed, shut off all phases of the external power supply for the MELSEC-ST system to replace a slice module.

(2) Online module change procedure

Be sure to perform an online module change by the procedure described below. Failure to do so can cause a malfunction or failure.

☞ Section 4.6.2 Online module change procedure

(3) External devices at online module change

Before starting online module change, confirm that the external device connected to the slice module to be removed does not malfunction.

Also, it is recommended to set 0 (OFF) in the Bw.n Bit output area and Ww.n Word output area of the slice module before replacement.

(4) Replaceable slice module

I/O modules and intelligent function modules only can be replaced by online module change.

Power distribution modules and base modules cannot be replaced online.

Before installing or removing a power distribution module or base module, shut off all phases of the external power supply.

Failure to do so may damage all of the MELSEC-ST system modules.

(5) Number of replaceable slice modules

Only one slice module can be replaced in a single online module change.

To replace multiple slice modules, perform a separate online module change for each module.

(6) Replaceable slice module

Only the slice modules of the same model name can be replaced online.
Replacing a slice module with a different slice module model and adding a new slice module is not allowed.

(7) Command execution during online module change

While an online module change is being executed (while the REL. LED of the head module is on), no command can be executed to the slice module being replaced online.
An attempt to execute a command to the slice module in such a case will cause an error.

(8) Parameter change during online module change

When changing a command parameter of the slice module, which is being replaced online (the head module's REL. LED is on), from the master station, wait until the online module change is completed.

(9) The ERR. LED of the head module in online module change status

The ERR. LED of the head module in online module change status will turn on only when an error related to the online module change occurs.
It will not turn on or flash when any other error occurs.

(10) I/O data during online module change

While online module change is being executed for a slice module (while the REL. LED of the head module is on), the following data of the slice module are all set to 0 (OFF).

- Br.n Bit input area
- Wr.n Word input area

(11) When Hold is set for the Clear/Hold setting

If an output module, for which "Hold" is set in the Clear/Hold setting, is replaced online while communication with the master station is disconnected, the Bw.n Bit output area value is set to 0 (OFF).

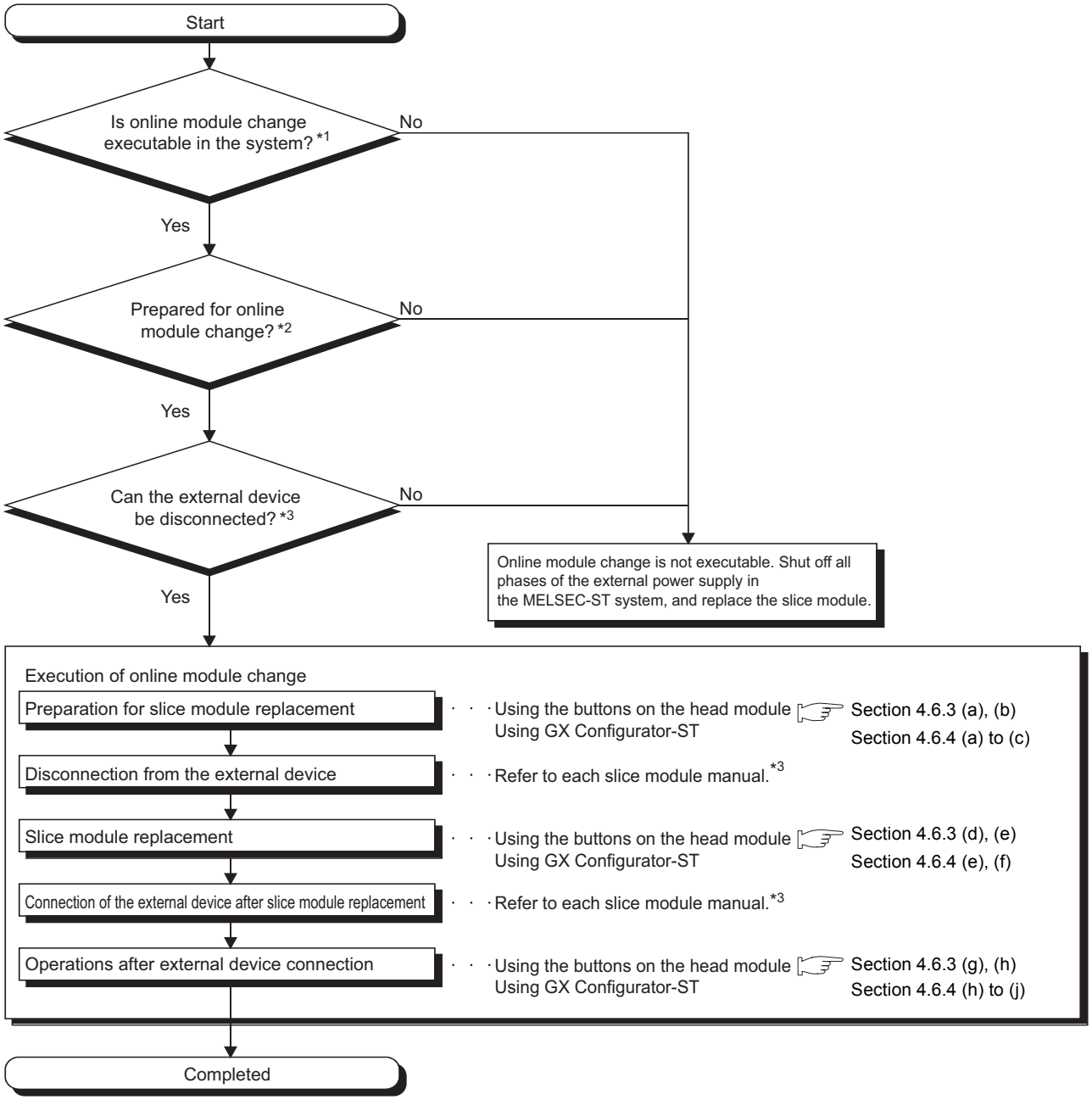
Even after this online change is completed, the Bw.n Bit output area value will not return to the value held.

(12) Forced output test during online module change

The forced output test cannot be performed for a slice module in online module change status.
After completion of the online module change, perform the forced output test.

4.6.2 Online module change procedure

This section explains the online module change procedure.
Observe the following procedure.


Start
Is online module change executable in the system? *1
No
Yes
Prepared for online module change? *2
No
Yes
Can the external device be disconnected? *3
No
Yes
Online module change is not executable. Shut off all phases of the external power supply in the MELSEC-ST system, and replace the slice module.
Execution of online module change
Preparation for slice module replacement
Using the buttons on the head module
Using GX Configurator-ST
Section 4.6.3 (a), (b)
Section 4.6.4 (a) to (c)
Disconnection from the external device
Refer to each slice module manual.*3
Slice module replacement
Using the buttons on the head module
Using GX Configurator-ST
Section 4.6.3 (d), (e)
Section 4.6.4 (e), (f)
Connection of the external device after slice module replacement
Refer to each slice module manual.*3
Operations after external device connection
Using the buttons on the head module
Using GX Configurator-ST
Section 4.6.3 (g), (h)
Section 4.6.4 (h) to (j)
Completed

*1 ☞ MELSEC-ST System User's Manual, "3.4 Precautions for System Configuration"
*2 ☞ Each slice module manual, "Preparation for Online Module Change"
*3 ☞ Each slice module manual, "Disconnecting/connecting the External Device for Online Module Change"

Figure 4.10 Online module change procedure

4.6.3 Online module change using the buttons on the head module

This section explains how to perform online module change using the buttons on the head module.

[Preparation for slice module replacement]

(a) Specify a slice module to be replaced online.
Press the + (plus) button.
- When the + (plus) button is pressed, the RUN LED on the bus refreshing module next to the right of the head module starts flashing (at 0.25s intervals).
- Press the + (plus) or - (minus) button until the RUN LED of the target module flashes (at 0.25s intervals)*1.

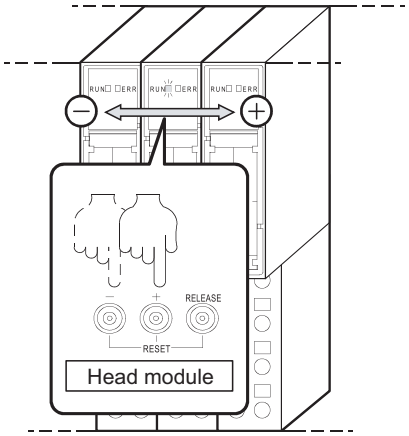


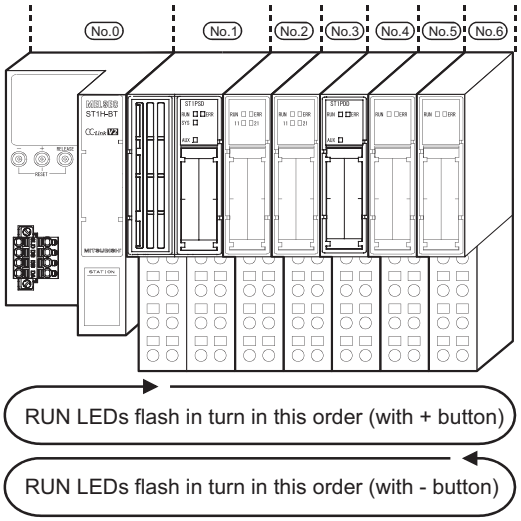
Figure 4.11 Specifying a slice module

To stop the online module change, press the + (plus) or - (minus) button until the RUN LED on the head module flashes (at 0.25s intervals).
For the + and - button operations, refer to Remarks on the next page.

* 1 If the RUN LED does not flash, check whether the RUN LED on another slice module (for example, a slice module on the right or left to the target module) flashes (at 0.25s intervals) or not.
Alternatively perform online module change from GX Configurator-ST.
If the RUN LED of the target slice module does not flash (at 0.25s intervals) after taking the above actions, the slice module may have a hardware fault.

Remark

The following explains how to operate the + and - buttons of the head module.



<When the + button is pressed>
1) When the + button is pressed, the RUN LED of No.1 (bus refreshing module on the right next to the head module) starts flashing (at 0.25s intervals).
2) With each press of the + button, the RUN LED of each module flashes (at 0.25s intervals) in turn in order from No.2 to No.6.
3) If the button is pressed while the RUN LED of No.6 is flashing, the head module has a turn.
However, the RUN LED status of the head module does not change.

<When the - button is pressed>
1) When the - button is pressed, the RUN LED of No.6 (the rightmost slice module in the MELSEC-ST system) starts flashing (at 0.25s intervals).
2) With each press of the - button, the RUN LED of each module starts flashing (at 0.25s intervals) in order from No.5 to No.1.
3) If the button is pressed while the RUN LED of No.1 is flashing, the head module has a turn.
However, the RUN LED status of the head module does not change.

Figure 4.12 The + and - buttons

(b) Press the RELEASE button on the head module until the REL. LED turns on.

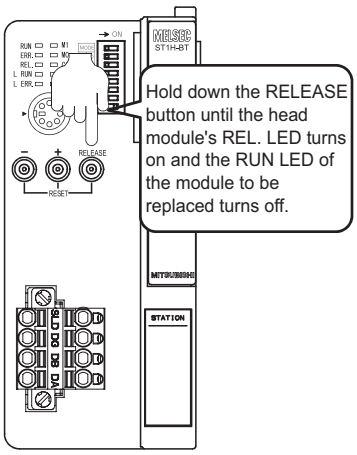

Hold down the RELEASE button until the head module's REL. LED turns on and the RUN LED of the module to be replaced turns off.
RELEASE
RESET
STATION

Figure 4.13 The REL. LED turns on.

When the REL. LED turns on, command parameters are transferred from the slice module to be replaced online and saved into the head module.
The following conditions indicate that the module change is ready for online module change after processing the RELEASE button.

- The REL. LED on the head module turns on.*2
- The RUN LED on the slice module to be replaced online turns off.

* 2 If the REL. and ERR. LEDs turned on, an error may have occurred during online module change. Identify the error and take action. (☞ Section 9.7 Error Codes)

[Disconnection from the external device]

(c) Disconnect the external device from the slice module for which online module change is performed. (☞Manual for the slice module, "Disconnecting/ Connecting the External Device for Online Module Change")

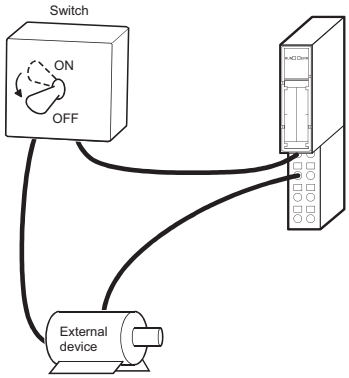


Figure 4.14 Disconnection from the external device

POINT

When the external device cannot be disconnected as instructed in the slice module manual, shut off all phases of the external power supply for the MELSEC-ST system and then replace the slice module.

[Slice module replacement]

(d) Remove the slice module to be replaced online from the base module.

(e) Install a new slice module of the same model name as the removed one to the base module.

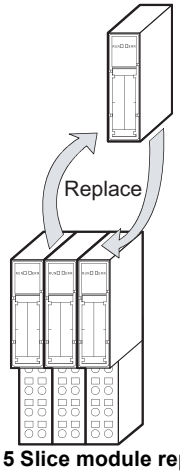


Figure 4.15 Slice module replacement

[Connection of the external device after slice module replacement]

(f) After installing a new slice module, connect the external device.
(☞ Manual for the slice module, "Disconnecting/Connecting the External Device for Online Module Change")

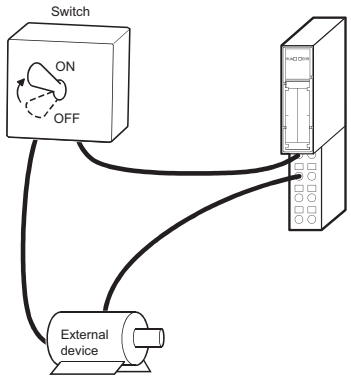


Figure 4.16 Connection of the external device

[Operations after external device connection]

(g) After installing a new slice module, press the RELEASE button on the head module until the REL. LED flashes.

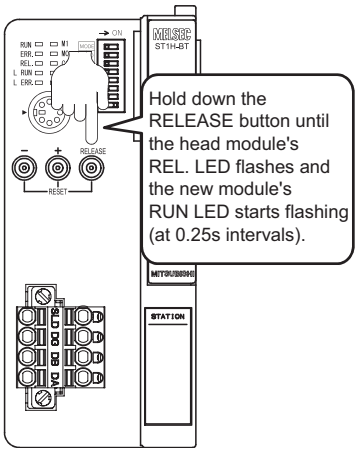

Hold down the RELEASE button until the head module's REL. LED flashes and the new module's RUN LED starts flashing (at 0.25s intervals).
RELEASE
RESET
STATION

Figure 4.17 Processing after external device connection

When the REL. LED starts flashing, the head module writes the command parameters saved in (b) to the new slice module.
Confirm the following conditions, and release the RELEASE button.

- The REL. LED on the head module flashes.*3*4
- The RUN LED on the slice module replaced online flashes (at 0.25s intervals).

* 3 If the REL. and ERR. LEDs turned on, an error may have occurred during online module change. Identify the error and take action. (☞ Section 9.7 Error Codes)

* 4 If an error has occurred in operation (b) (error code C101H to C13FH), the REL. LED is flashing and the ERR. LED is on.
If operation (h) is completed in this condition, the intelligent function module will start the operation with the command parameters set to default.

(h) Press the RELEASE button again until the REL. LED turns off.*5

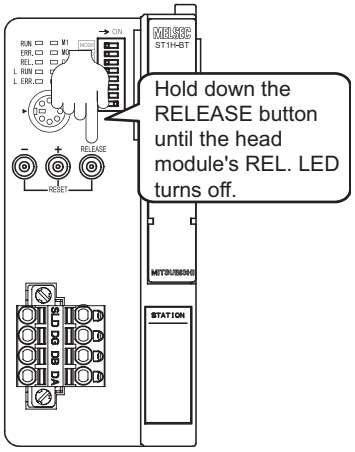


Figure 4.18 The REL. LED turns off.

When the REL. LED turns off, the online module change is completed.*6
Release the RELEASE button.
After the REL. LED turns off, the head module returns to normal mode, and resumes I/O data refresh.

* 5 If the RELEASE button is released before the REL. LED turns off, the system shows the following conditions (the status after completion of operation (b)):
  · The REL. LED on the head module is on.
  · The RUN LED on the slice module replaced online turns off.
  The operation can be redone from (d).
* 6 If the REL. and ERR. LEDs turned on, an error may have occurred during online module change. Identify the error and take action. (☞ Section 9.7 Error Codes)

4.6.4 Online module change from GX Configurator-ST

This section explains how to perform online module change from GX Configurator-ST.

POINT

If a slice module different from the target one is selected by mistake, perform any of the following.

(1) On the screen shown in (c)

Click the Cancel button to terminate online module change.

(2) On the screen shown in (d)

Without replacing the slice module, click the Next button, and perform all operations to (j) to complete the online module change once.

(3) During operation (h)

Mount the removed slice module again, click the Next button, and perform all operations to (j) to complete the online module change once.

[Preparation for slice module replacement]

(a) On the "System Monitor" screen, select a slice module for which online module change is performed.

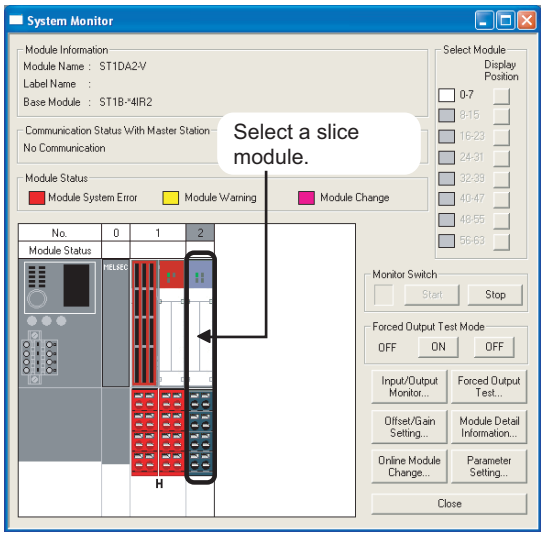


Figure 4.19 Specifying a slice module

(b) Click the [Online Module Change] button on the "System Monitor" screen. After clicking the [Online Module Change] button, confirm that the RUN LED of the selected slice module is flashing (at 0.25s intervals).

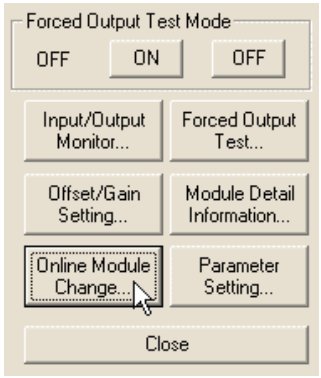


Figure 4.20 The [Online Module Change] button

Remark

In addition to the above, the following operations are also available.

- Click [Diagnostics] → [Online Module Change].
- Right-click on the slice module selected in (a), and click [Online Module Change] on the menu.

(c) Confirm that the slice module displayed as "Target Module" is the module to be replaced, and click the Next button.

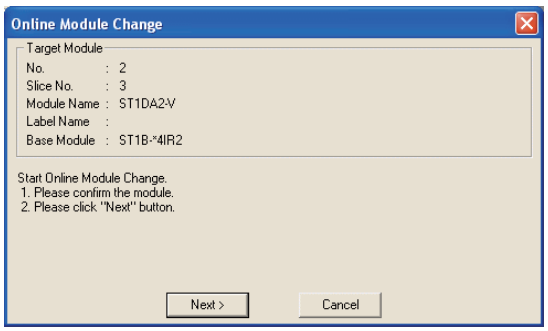


Figure 4.21 Confirming the slice module to be replaced

1) Clicking the Next button determines the slice module to be replaced, and the following processing is performed in the head module.
   - The mode of the head module is changed to the online module change mode.
   - Command parameters of the slice module to be replaced are saved into the head module.

   Clicking the Cancel button stops online module change.

   Clicking the Exit button returns the screen back to the status before performing (b).

2) After clicking the Next button, confirm the following module statuses.
   - The REL. LED of the head module is on.
   - The RUN LED of the slice module to be replaced is off.
   - The "Module Status" indicator of the slice module to be replaced has turned purple. This applies only when monitoring from the "System Monitor" screen.

3) If the command parameters could not be read from the slice module, the REL. and ERR. LEDs on the head module turn on, and an error message is displayed on the screen by operation (h). (☞ Figure 4.25)
   Identify the error and take action. (☞ Section 9.7 Error Codes)

[Disconnection from the external device]

(d) When the following screen appears, disconnect the external device from the slice module for which online module change is performed. (☞Manual for the slice module, "Disconnecting/Connecting the External Device for Online Module Change")

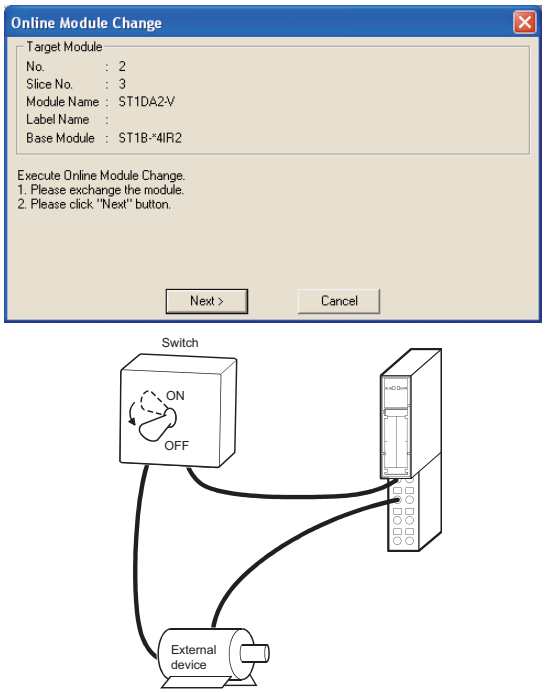


Figure 4.22 Disconnection from the external device

POINT

When the external device cannot be disconnected as instructed in the slice module manual, shut off all phases of the external power supply for the MELSEC-ST system and then replace the slice module.

[Slice module replacement]

(e) Remove the slice module to be replaced online from the base module.

(f) Install a new slice module of the same model name as the removed one to the base module.

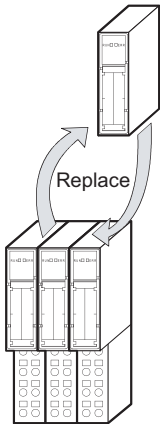


Figure 4.23 Slice module replacement

[Connection of the external device after slice module replacement]

(g) After installing a new slice module, connect the external device. (☞ Manual for the slice module, "Disconnecting/Connecting the External Device for Online Module Change")

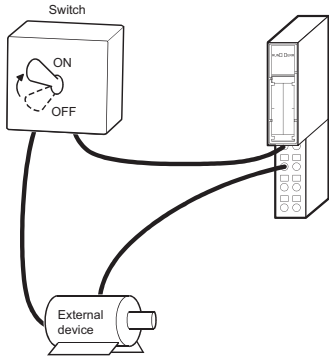


Figure 4.24 Connection of the external device

[Operations after external device connection]

(h) After connecting the external device, click the Next button on the screen shown in (d).

1) When the Next button is clicked, the following actions are performed.
- Checking whether the model name of the new slice module is the same as that of the removed one.
- Writing the command parameters saved in the head module in (c) to the new slice module.

Clicking the Cancel button stops online module change.
Terminate the online module change by the following procedure.
- On the restarted screen shown in (a), select the same slice module. If a different module is selected, an error occurs.
- Perform the operation in (b) to display the screen in (i), and click the Next button to terminate the online module change.

2) After clicking the Next button, confirm the following module statuses.
- The REL. LED of the head module is flashing.
- The RUN LED of the newly mounted slice module is flashing (at 0.25s intervals).

If the command parameters could not be loaded from the removed slice module, the REL. and ERR. LEDs of the head module turn on, and the following screen appears in GX Configurator-ST.

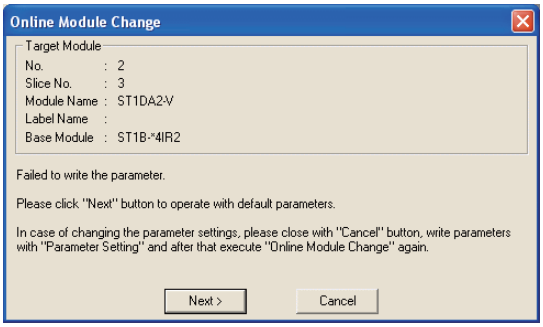

Online Module Change
Target Module
No. : 2
Slice No. : 3
Module Name : ST1DA2-V
Label Name :
Base Module : ST1B-*4IR2
Failed to write the parameter.
Please click "Next" button to operate with default parameters.
In case of changing the parameter settings, please close with "Cancel" button, write parameters with "Parameter Setting" and after that execute "Online Module Change" again.
Next >
Cancel

Figure 4.25 When failed to load command parameters

Identify the error and take action. (☞ Section 9.7 Error Codes)
If operation in (j) is completed in this condition, the intelligent function module will start the operation with the command parameters set to default.

(i) Clicking the Next button releases the head module from the online module change mode.

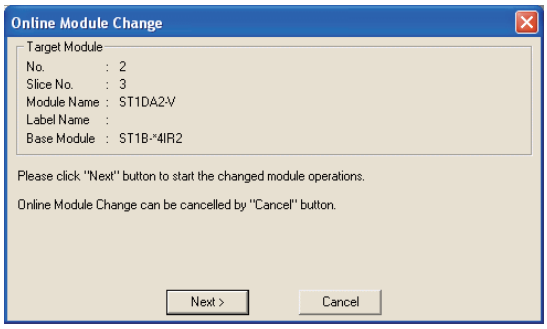

Online Module Change
Target Module
No. : 2
Slice No. : 3
Module Name : ST1DA2-V
Label Name :
Base Module : ST1B-*4IR2
Please click "Next" button to start the changed module operations.
Online Module Change can be cancelled by "Cancel" button.
Next >
Cancel

Figure 4.26 Exiting the online module change mode

1) Clicking the Next button performs the following.
   - The head module exits the online module change mode.
   - I/O data refresh is started.

   Clicking the Cancel button stops online module change.
   When stopped, the screen in (a) is displayed.
   Terminate the online module change by the following procedure.
   - On the restarted screen shown in (a), select the same slice module. If a different module is selected, an error occurs.
   - Perform the operation in (b) to display the screen in (c), and click the Cancel button.

2) After clicking the Next button, confirm that the following module statuses.
   - The REL. LED of the head module is off.
   - The RUN LED of the newly mounted slice module is on.
   - The "Module Status" indicator of the slice module to be replaced has turned white. This applies only when monitoring from the "System Monitor" screen.

3) If the head module could not exit the online module change mode, the REL. and ERR. LEDs on the head module turn on.
   Identify the error and take action. (☞ Section 9.7 Error Codes)

(j) The following screen appears showing that online module change is completed. Click the Finish button.

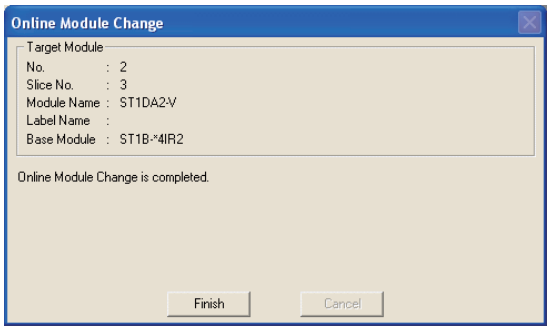


Figure 4.27 Completion of online module change

CHAPTER5 PREPARATION AND SETUP

This chapter describes the setting for operating the head module in the MELSEC-ST system and the setup procedures.

5.1 Implementation and Installation

This section describes handling precautions for unpackaging and installation.
For the implementation and installation of the MELSEC-ST system, refer to the following manual.
☞MELSEC-ST System User's Manual

5.1.1 Handling precautions

The following are handling precautions for the head module.

(1) Do not drop or apply severe shock to the module case since it is made of resin.
Doing so may damage the module.

(2) Do not disassemble or remodel the module.
Doing so may cause a failure, malfunction, injury, or fire.

(3) Prevent foreign matter such as dust or wiring chips from entering the module.
Failure to do so may cause a fire, failure or malfunction.

(4) Tighten the terminal screws of the module within the following range.

Table 5.1 Screw tightening torque

Screw	Tightening torque range
Terminal block fixing screw	0.4 to 0.5 N·m (compliant with IEC60999)

5.2 Preparation and Setup

This section gives preparatory procedures for operation.

5.2.1 Checking the MELSEC-ST system

Check the MELSEC-ST system before starting operation.
Check the system by the following procedures, and start it up according to the flowchart in Section 5.2.2.

1) Check if the I/O points for the slice modules to be mounted are within the following range.

Table 5.2 I/O point range

Item	Point
Br.n Bit input area	252 bits or less*1
Bw.n Bit output area	252 bits or less*1
Wr.n Word input area	52 words or less
Ww.n Word output area	52 words or less

* 1 The available points will decrease by two points for each additional power distribution module.

2) When the master module is in remote net Ver.1 mode, however, the total I/O points of slice modules must be set within the following ranges.

Table 5.3 I/O point range (Remote net Ver.1 mode)

Item	Point
Br.n Bit input area	112 bits or less
Bw.n Bit output area	112 bits or less
Wr.n Word input area	14 words or less
Ww.n Word output area	14 words or less

POINT

When the points shown in Table 5.3 are exceeded, use two or more head modules so that the points for each will be within the allowable range.
If the points in Table 5.3 are exceeded, the head module will operate as a Ver.2 remote device station.

5.2.2 Pre-operation procedures

The pre-operation procedures are shown below.

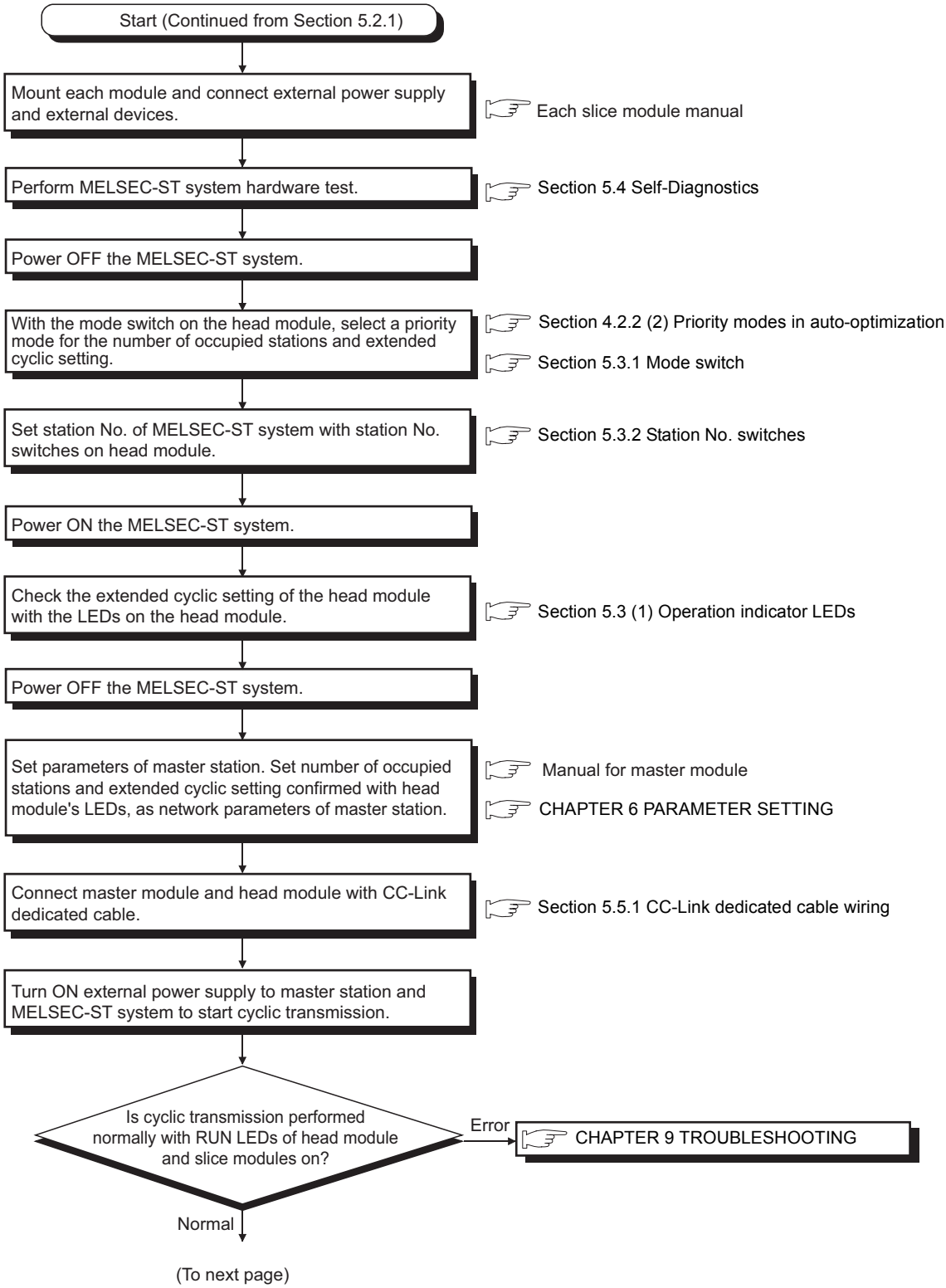

Start (Continued from Section 5.2.1)
Mount each module and connect external power supply and external devices.
Each slice module manual
Perform MELSEC-ST system hardware test.
Section 5.4 Self-Diagnostics
Power OFF the MELSEC-ST system.
With the mode switch on the head module, select a priority mode for the number of occupied stations and extended cyclic setting.
Section 4.2.2 (2) Priority modes in auto-optimization
Section 5.3.1 Mode switch
Set station No. of MELSEC-ST system with station No. switches on head module.
Section 5.3.2 Station No. switches
Power ON the MELSEC-ST system.
Check the extended cyclic setting of the head module with the LEDs on the head module.
Section 5.3 (1) Operation indicator LEDs
Power OFF the MELSEC-ST system.
Set parameters of master station. Set number of occupied stations and extended cyclic setting confirmed with head module's LEDs, as network parameters of master station.
Manual for master module
CHAPTER 6 PARAMETER SETTING
Connect master module and head module with CC-Link dedicated cable.
Section 5.5.1 CC-Link dedicated cable wiring
Turn ON external power supply to master station and MELSEC-ST system to start cyclic transmission.
Is cyclic transmission performed normally with RUN LEDs of head module and slice modules on?
Error
CHAPTER 9 TROUBLESHOOTING
Normal
(To next page)

Figure 5.1 Pre-operation procedures

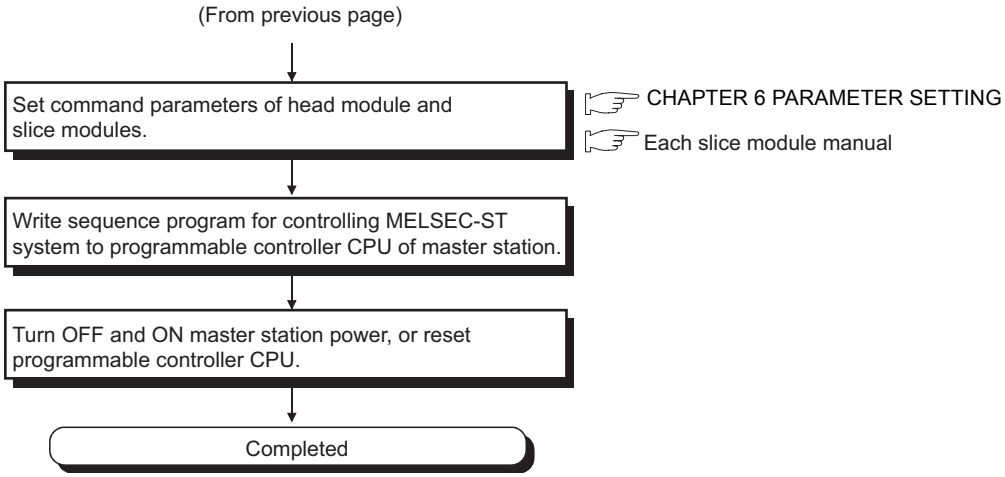

(From previous page)
Set command parameters of head module and slice modules.
CHAPTER 6 PARAMETER SETTING
Each slice module manual
Write sequence program for controlling MELSEC-ST system to programmable controller CPU of master station.
Turn OFF and ON master station power, or reset programmable controller CPU.
Completed

Figure 5.1 Pre-operation procedures (continued)

5.3 Part Names and Settings

This section explains the names and settings of the parts of the head module.

[Front face (with the connector cover open)] [Right side]

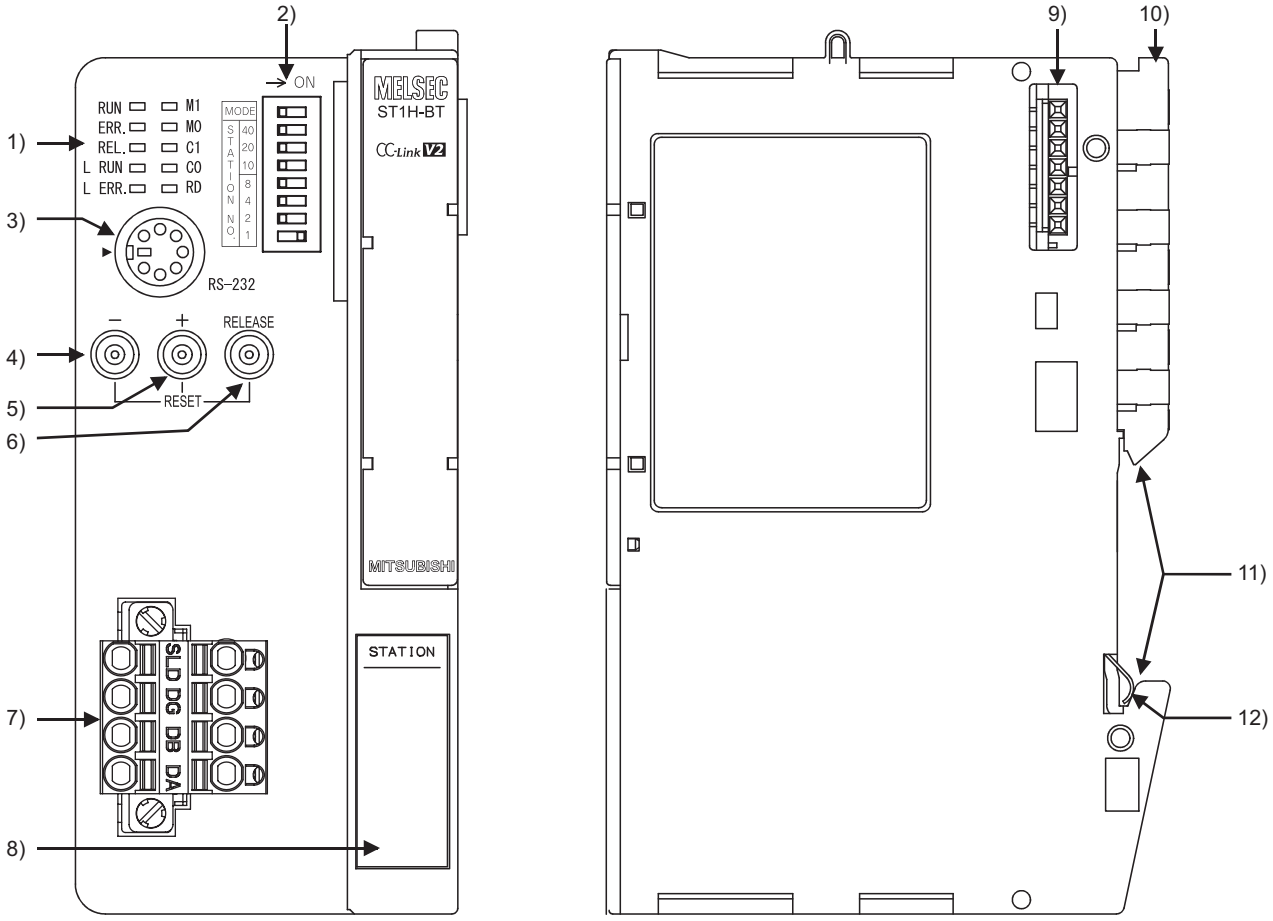


Figure 5.2 Part names

Table 5.4 Part names and settings

	Name	Description
1)	Operation indicator LED	Indicates the operating status of the head module. (☞ (1) Operation indicator LEDs in this section)
2)	Mode switch and station No. switches	Used for setting the priority mode and station No. of the head module, and for switching to the self-diagnostic function mode. For details, refer to the following. •Priority mode setting: ☞ Section 5.3.1 Mode switch •Station No. setting: ☞ Section 5.3.2 Station No. switches •Self-diagnostics execution: ☞ Section 5.4 Self-Diagnostics
3)	RS-232 interface connector	RS-232 interface connector for connecting a personal computer when using GX Configurator-ST. For system configurations for using GX Configurator-ST, refer to the following manual. ☞ GX Configurator-ST Operating Manual
4)	- (minus) button	These buttons are provided for online module change and head module reset. For details, refer to the following. •Online module change: ☞ Section 4.6 Online Module Change Function •Head module reset: ☞ Section 5.3.3 Resetting
5)	+ (plus) button	
6)	RELEASE button	

Table 5.4 Part names and settings(Continued)

Name		Description
7)	Terminal block	Terminal block for connecting a CC-Link dedicated cable to the head module. (☞ Section 5.5.1 CC-Link dedicated cable wiring)
8)	Indication label	Provided for writing information such as station No. of the head module.
9)	Base module connector	Connects the base module for the power distribution module which is connected next to the right of the head module.
10)	Lock lever	Used to remove the head module from the DIN rail.
11)	DIN rail mounting groove	Groove for mounting the head module to a DIN rail.
12)	FG contact	A metal spring for grounding. When the module is installed to a DIN rail, the function ground (FG1) of the base module is connected through the DIN rail.

(1) Operation indicator LEDs

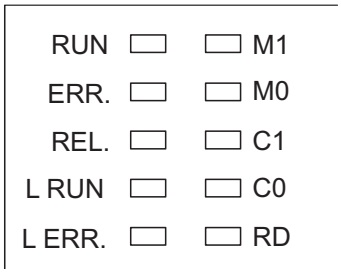


Figure 5.3 Operation indicator LEDs

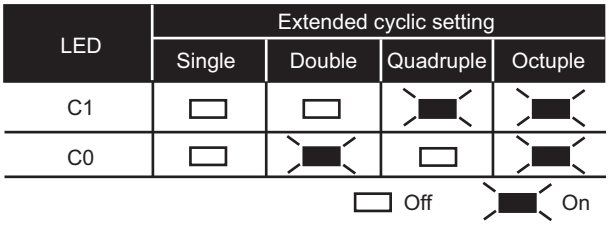
Table 5.5 Details of LEDs

LED	LED status	Description	Reference section
RUN	On	Operating normally	-
	Flashing	In self-diagnostics or forced output test mode	Section 4.1 (5), Section 5.4
	Off	Hardware fault (watchdog timer error) or external power supply failure	Section 9.4.1
ERR.	On	Error occurred in head module or slice module.	Section 9.4.4, Section 9.7
	Flashing	•Communication error •Switch setting change error (Station No. changed during communication) •CC-Link version mismatch error	
	Off	Head module and slice modules normal	-
REL.	On	Module being replaced online	Section 4.6
	Flashing		
	Off	Online module change completed or not being executed.	
L RUN	On	Communicating normally	-
	Off	Communication disrupted or timeout error	Section 9.4.3
L ERR.	On	Communication error or invalid station No. setting	Section 9.4.2
	Flashing (regularly)	Station No. changed with station No. switches during normal communication.	
	Flashing (irregularly)	•No terminating resistor connected •Head module or CC-Link dedicated cable affected by noise.	
	Off	Communicating normally	-
M1	On, Off	These LEDs indicate the number of stations occupied by the head module on CC-Link. The head module automatically optimizes the number of occupied stations depending on the slice modules mounted. Check the indication while the RUN LED is on.	Section 4.2.2
M0			

LED	Number of occupied stations			
	1 station	2 stations	3 stations	4 stations
M1	Off	Off	On	On
M0	Off	On	Off	On

Table 5.5 Details of LEDs(Continued)

<table>
<tr><th>LED</th><th>LED status</th><th>Description</th><th>Reference section</th></tr>
<tr><td>C1

C0</td><td>On, Off</td><td>These LEDs indicate the extended cyclic setting of the head module on CC-Link.
The head module automatically optimizes the extended cyclic setting depending on the slice modules mounted.
Check the indication while the RUN LED is on.
 
</td><td>Section 4.2.2</td></tr>
<tr><td rowspan="3">RD</td><td>On</td><td rowspan="2">Data being received</td><td rowspan="2">-</td></tr>
<tr><td>Flashing</td></tr>
<tr><td>Off</td><td>Data not being received</td><td>Section 9.5</td></tr>
</table>

5.3.1 Mode switch

This section explains the mode switch on the head module.

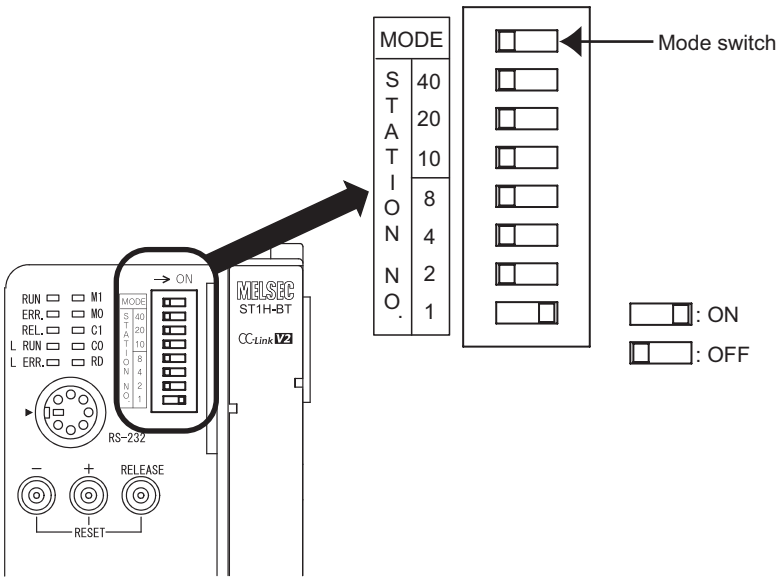


Figure 5.4 Mode switch

(1) Purpose

Set a priority mode for the number of occupied stations and extended cyclic setting with the mode switch. (☞Section 4.2.2 (2) Priority modes in auto-optimization)

(2) Setting

OFF: Priority high speed mode (Default)
ON: Priority Min. stations mode

(3) Setting method

1) Install slice modules to the head module.
2) Select the priority high speed mode or priority min. stations mode with the mode switch of the head module. (☞ Section 4.2.2 (2) Priority modes in auto-optimization)
   Note that, when the master module is in remote net Ver.1 mode, select the priority high speed mode.
3) Power ON or reset the head module.
4) With the LEDs on the head module, check the number of occupied stations and extended cyclic setting. (☞ Section 5.3 (1) Operation indicator LEDs)

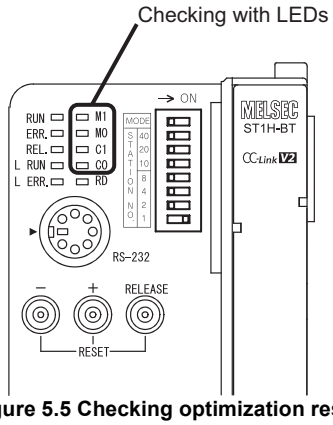


Figure 5.5 Checking optimization result

5.3.2 Station No. switches

This section explains the station No. switches on the head module.

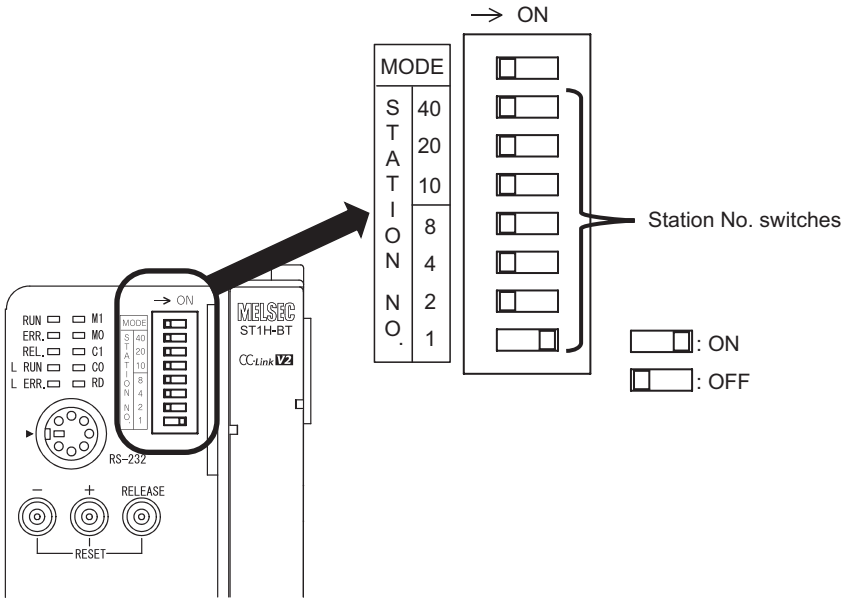


Figure 5.6 Station No. switches

(1) Purpose

Use the station No. switches on the head module for the following:

- Setting station No. of the head module
- Executing the self-diagnostic function of the head module (☞Section 5.4 Self-Diagnostics)

(2) Setting range

The setting range of the station No. switches is shown below.
The factory default is 0 (all OFF).

- Setting station No. of the head module: 1 to 64
- Executing the self-diagnostic function: 70 (☞Section 5.4 Self-Diagnostics)

(3) Setting method

The total value of the station No. switches that are ON is set as the station No. of the head module.

STATION NO. switches, "10", "20", and "40" are used to set a tens place of station No.
STATION NO. switches, "1", "2", "4", and "8" are used to set a ones place of station No.

Table 5.6 Station No. switch settings

Station No.	STATION NO.						
	10s place			1s place			
	40	20	10	8	4	2	1
1	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	OFF	ON	ON
4	OFF	OFF	OFF	OFF	ON	OFF	OFF
. .	. .	. .	. .	. .	. .	. .	. .
9	OFF	OFF	OFF	ON	OFF	OFF	ON
10	OFF	OFF	ON	OFF	OFF	OFF	OFF
11	OFF	OFF	ON	OFF	OFF	OFF	ON
. .	. .	. .	. .	. .	. .	. .	. .
32	OFF	ON	ON	OFF	OFF	ON	OFF
. .	. .	. .	. .	. .	. .	. .	. .
63	ON	ON	OFF	OFF	OFF	ON	ON
64	ON	ON	OFF	OFF	ON	OFF	OFF

For example, to set the station No. to "32", set the switches as shown below.

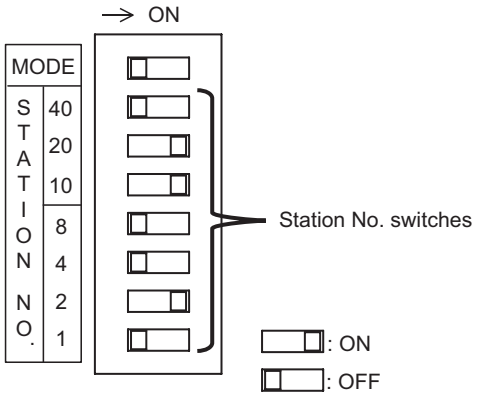


Figure 5.7 Setting "32" as station No.

(4) Precautions

(a) When the setting is out of range
Set the station No. switches within the range shown in (2) in this section.
If the setting is out of the range shown in (2) in this section, when the head module is powered up from the external power supply or is reset, an error occurs and the L ERR. LED turns on.

(b) When the total of 1s-place values is 10 or more
Do not set the switches like the table below (the total of 1s-place values is 10 or more.)
An error will occur in the head module, the ERR. LED and L ERR. LED will turn on.

Table 5.7 When the total of 1s-place values is 10 or more (Incorrect setting)

Station No.	STATION NO.						
	10s place			1s place			
	40	20	10	8	4	2	1
32	OFF	ON	OFF	ON	ON	OFF	OFF

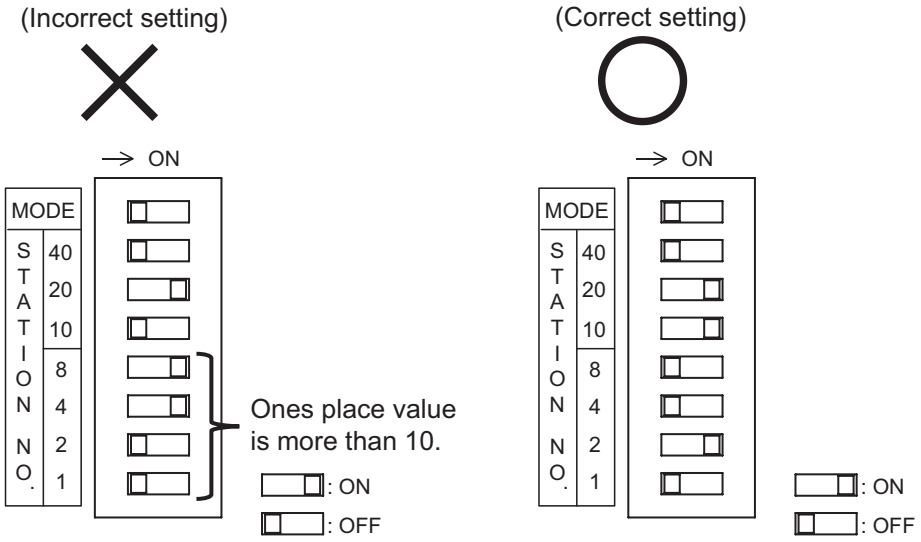


Figure 5.8 Setting "32" as station No. (Incorrect and correct settings)

5.3.3 Resetting

This section explains how to reset the head module.

(1) Purpose

Reset the hardware of the head module.

(2) Resetting method

(a) Resetting with the RELEASE, + (plus), and - (minus) buttons on the head module

1) Press the RELEASE, + , and - buttons at the same time.

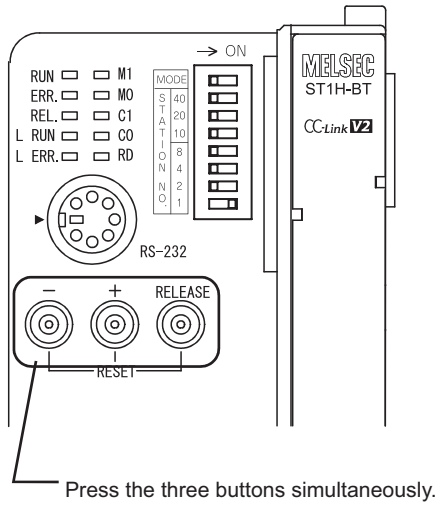


Figure 5.9 Resetting the head module

2) When all of the LEDs turn off, it means that resetting is completed. Release the RELEASE, + , and - buttons.

(b) Resetting from GX Configurator-ST

In GX Configurator-ST, select [Online] → [Reset Head Module].
For details, refer to the following.
☞ GX Configurator-ST Operating Manual, "Reset Head Module"

5.4 Self-Diagnostics

In the self-diagnostics, the head module itself is tested.

(1) Self-diagnostics execution procedures

The procedures for executing the self-diagnostics are shown below.

(a) When the external power supply of the MELSEC-ST system is ON, turn it OFF.

(b) Disconnect the CC-Link dedicated cable from the head module.

(c) Set the station No. of the head module to "70" as illustrated below.

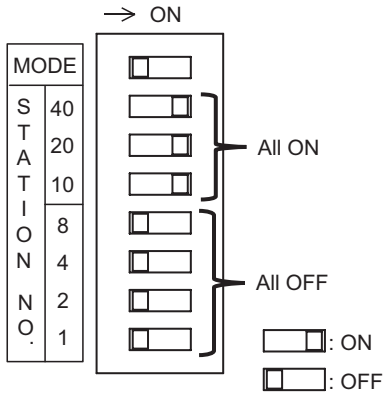


Figure 5.10 Station No. setting for self-diagnostics (Station No.70)

(d) Turn ON the external power supply of the MELSEC-ST system.

(e) After the external power supply of the MELSEC-ST system is turned ON, the self-diagnostics is automatically executed.
During the execution, the RUN and M1 LEDs flash.

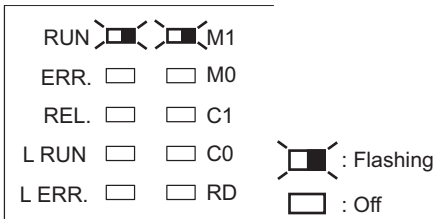


Figure 5.11 Self-diagnostics in execution

(f) When the RUN LED turns on or off, it indicates that the self-diagnostics is completed.
Check the result of the self-diagnostics with the LEDs on the head module.
(☞ (2) Self-diagnostics execution result in this section)

(2) Self-diagnostics execution result

(a) When normally completed (RUN LED: On)

When the RUN LED turns on after execution of the self-diagnostics, it indicates normal completion.

Set station No. of the head module again to that for CC-Link (1 to 64).

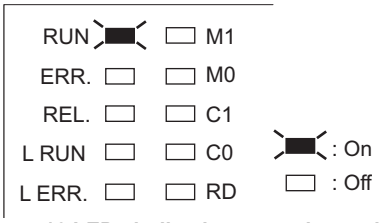


Figure 5.12 LEDs indicating normal completion

(b) When failed (RUN LED: Off, ERR. LED: On)

When the RUN LED turns off and the ERR. LED turns on after execution of the self-diagnostics, it indicates failure.

Execute the self-diagnostics again.

If it fails again, the hardware of the head module may be faulty.

Please check the M0, C1, and C0 LED states, and consult your local Mitsubishi representative.

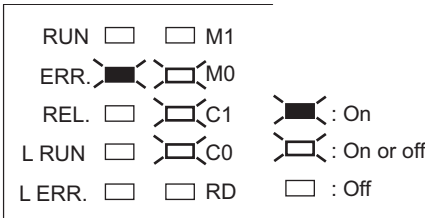


Figure 5.13 LEDs indicating failure

5.5 Wiring

This section describes CC-Link dedicated cable wiring and wiring precautions.

5.5.1 CC-Link dedicated cable wiring

This section provides information on CC-Link dedicated cable connection to the head module and terminating resistors.

(1) CC-Link dedicated cable

Use CC-Link dedicated cables for CC-Link systems.
CC-Link system performance cannot be guaranteed if any other than CC-Link dedicated cables is used.
For information including CC-Link dedicated cable specifications, access the following website.
☞CC-Link Partner Association: http://www.cc-link.org/

(2) Applicable wire size

Use wires of AWG#24 to #12 with a diameter of 0.5 to 1.78mm and a stranded wire size of 0.2 to 2.5mm^2.

(3) Stripping the cable end

(a) Cable strip length
The cable strip length must be approx. 10mm.
If the cable is stripped too much, the cable core may stick out of the terminal block and may cause an electric shock or short circuit with an adjacent terminal block.
If the stripped length is too short, sufficient contact may not be ensured.

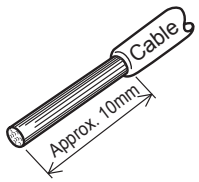


Figure 5.14 Cable strip length

(b) When using a bar terminal
1) Select a bar terminal suitable for the cable size.
2) Insert the cable so that the cable core will stick out 0 to 0.5mm from the sleeve edge.

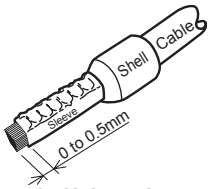


Figure 5.15 Using a bar terminal

3) Use an appropriate crimp tool to crimp the bar terminal. (☞(4) Applicable solderless terminals (bar terminals) and crimping tools in this section)
For the crimping method, refer to the following manual.
☞Manual for the terminal or crimping tool

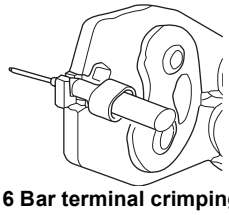


Figure 5.16 Bar terminal crimping example

4) Check the appearance of the bar terminal after crimping.
If it is not crimped properly or is damaged on the side, do not use the terminal. (See the illustration below.)

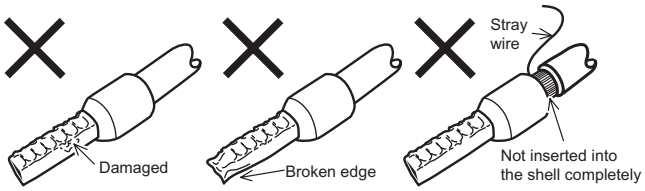


Figure 5.17 Checking the bar terminal

(4) Applicable solderless terminals (bar terminals) and crimping tools

Table 5.8 Applicable solderless terminals (bar terminals) and crimping tools

Product name	Model	Manufacturer	Remarks
Bar-type solderless terminal	FA-VTC125T9	For inquiries and orders, contact your local representative of Mitsubishi Electric Engineering Co., Ltd.	For CC-Link dedicated cables (0.3 to 1.65mm^2)
Tool for bar-type solderless terminals	FA-NH65A		-
Bar-type solderless terminal	TE0.5-10	For inquiries and orders, contact your local representative of NICHIFU TERMINAL MFG. Co., Ltd.	For CC-Link dedicated cables (0.3 to 0.5mm^2)
Tool for bar-type solderless terminals	NH-79		-
Bar-type solderless terminal	AI0.5-10WH	For inquiries and orders, contact your local representative of Phoenix Contact.	For CC-Link dedicated cables (0.5mm^2)
Tool for bartype solderless terminals	CRIMPFOX UD6		-
	CRIMPFOX UD6-4		*1
	CRIMPFOX UD6-6		*1
	CRIMPFOX ZA3		-

* 1 If a shielded wire or FG wire is crimped to a bar terminal using the CRIMPFOX UD6-4 or CRIMPFOX UD6-6, the wire may not be connected to the terminal block depending on the condition of the bar terminal's cross section after crimping.

(5) Connecting the CC-Link dedicated cable

(a) Screwdriver used for connecting or disconnecting cables
use a recommended screwdriver or equivalent for cable connection or disconnection. (☞ Appendix 2 Recommended Screwdriver)

(b) Connection method

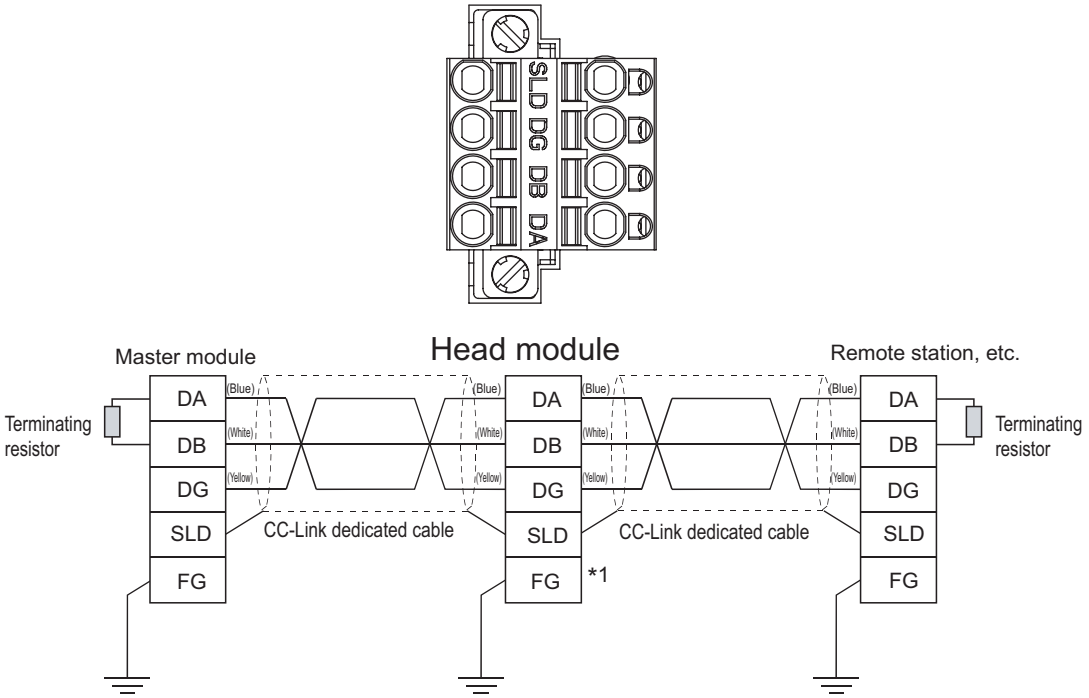


Figure 5.18 CC-Link dedicated cable connection method

* 1 FG of the head module is functionally grounded (FG1) through the DIN rail when the head module is mounted to the DIN rail.

POINT

(1) To each of the modules located at both ends of the CC-Link system, connect a terminating resistor provided with the module.

(2) When the head module is located at one end of the CC-Link system, connect the terminating resistor (110Ω and 1/2W) provided with the head module.
Note that, for use of a CC-Link Ver.1.00-compatible high-performance cable, a terminating resistor of 130Ω and 1/2W must be used.
For terminating resistors of 130Ω and 1/2W, please consult your local Mitsubishi representative.

(3) Connect the terminating resistor between "DA" and "DB".

(c) Connecting the cable to the terminal block
With the open/close button pressed by a slotted screwdriver, fully insert the cable into the correct opening.
When using a bar terminal, the cable can be inserted without pressing the button.

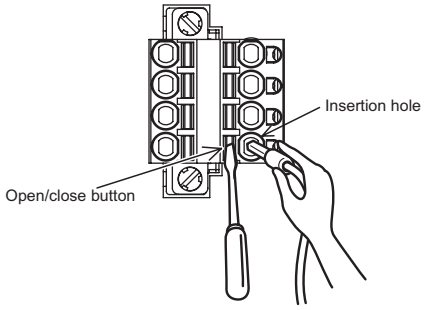


Figure 5.19 Method for connecting a cable to the terminal block

(d) Disconnecting the cable
With the open/close button fully pressed by a slotted screwdriver, pull out the cable.

5.5.2 Wiring precautions

For full performance of the head module functions and system construction with high reliability, the affect of noise to the external wiring must be minimized.
The following are precautions for the external wiring of the head module.

(1) CC-Link dedicated cable wiring
Do not run the CC-Link dedicated cable near the main circuit, power cables, or load cables for other than the MELSEC-ST system or do not install them together.
Doing so may induce noise or a surge current into the head module.

(2) Wiring from I/O modules
Keep CC-Link dedicated cables away from I/O module cables as much as possible.

CHAPTER6 PARAMETER SETTING

This chapter describes parameter setting.

6.1 Parameters for Using MELSEC-ST System

For using the MELSEC-ST system, set the following parameters.

Table 6.1 Parameter list

Parameter	Description	Setting method	Reference section
Network parameters	Parameters for CC-Link. Settings for operating the CC-Link system, such as the total number of modules connected, are configured.	GX Developer	Section 6.1.1
Command parameters	Parameters for MELSEC-ST system. Settings for the head module and each slice module are configured.	Use either of the following.*1 •GX Configurator-ST •Dedicated instruction of master station (RDMSG instruction)	Section 6.1.2

* 1 Command parameters for the head module, input modules, and output modules can be set only by the master station's dedicated instruction (RDMSG).

6.1.1 Network parameters

This section describes network parameters related to the MELSEC-ST system.

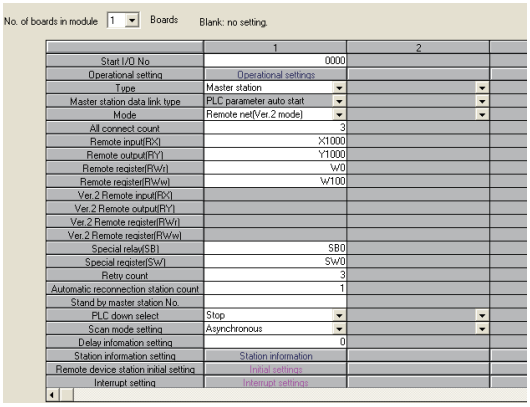
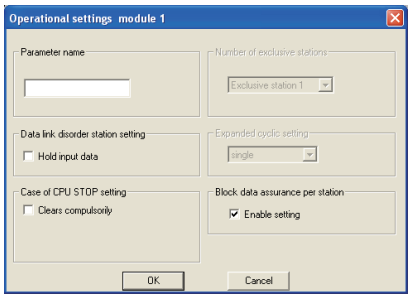
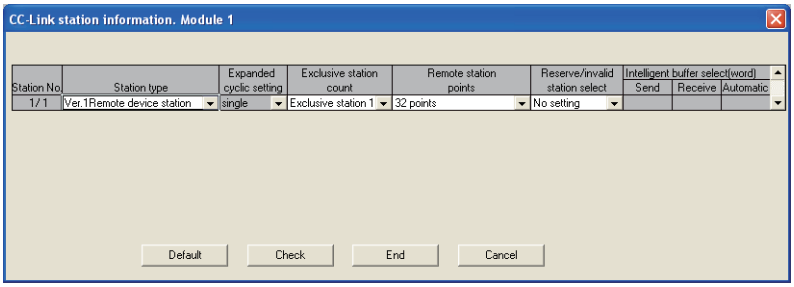


Figure 6.1 Network parameters screen

Table 6.2 Setting items of Network parameters

Item	Description
Operational settings	Configure operational settings for the master module.  •Block data assurance per station Check the box to enable this function. (☞ Section 4.2.3 Consistency function)
Mode	Set a CC-Link mode. When the extended cyclic setting of the head module is double or more setting, select Remote net Ver.2 mode or Remote net additional mode. (☞ Section 5.3 (1) Operation indicator LEDs)
Station information	Set the station information on the MELSEC-ST system (remote device station).  •Station type Set the station type of the head module. (☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting, Section 5.2.2 Pre-operation procedures) •Expanded cyclic setting Set the extended cyclic setting, which is indicated with the head module's LEDs. (☞ Section 5.3 (1) Operation indicator LEDs) •Exclusive station count Set the number of occupied stations, which is indicated with the head module's LEDs. (☞ Section 5.3 (1) Operation indicator LEDs)

Remark

For network parameters other than those mentioned in this chapter, refer to the following manual.

☞ Manual for the master module

6.1.2 Command parameters

This section explains the command parameters.

(1) Command parameter list

Following command parameters are available.

Table 6.3 Command parameter list

Item		Description	Reference section
Head module	Output status at module error	Set the output status for the case of a head module error. [Setting range] •Stop (Default) •Continue	Section 4.3.1
	Consistency function	Set whether to enable or disable the consistency function. [Setting range] •Enable (Default) •Disable	Section 4.2.3
Power distribution module	-	No command parameters are provided for power distribution modules.	-
Input module	Response time	Set response time of the input module. [Setting range] •1.5ms (Default) •0.5ms	-
Output module	Clear/Hold setting	Set the output status of the output module for the case of a communication error or a module error. [Setting range] •Clear (Default) •Hold	-
Intelligent function module		Refer to the following manual. ☞ Manual for the intelligent function module, "About parameters"	

(2) Command parameter setting method

(a) Setting with GX Configurator-ST
Set command parameters in GX Configurator-ST.
(☞ GX Configurator-ST Operating Manual)

(b) Setting with dedicated instruction (RDMSG) of master station
Set command parameters by sending a command to the MELSEC-ST system with a dedicated instruction (RDMSG) of the master station.
Command parameters are set by the following.

1) Set command parameters with Initial data individual write request (command No.: 8107H/0107H).
2) To batch-set the same command parameters to multiple slice modules, Initial data batch write request (command No.: 8106H) is useful.

POINT

(1) When using the system by default, no command parameter setting is needed.
(2) Command parameters for the head module, input modules, and output modules can be set only by the master station's dedicated instruction (RDMSG).

Remark

For the command execution method.
☞CHAPTER 8 COMMANDS

CHAPTER7 PROGRAMMING

This chapter describes programming of the head module.

7.1 System Configuration Example

The following system example is used for explanation in Section 7.2.

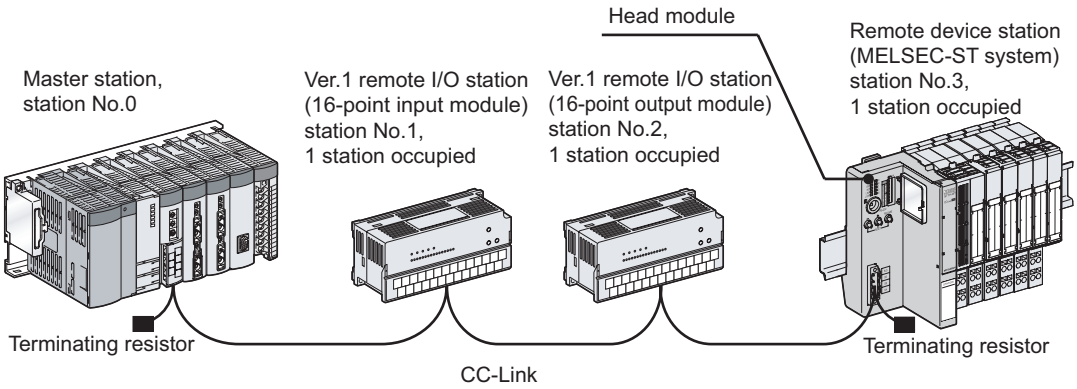


Figure 7.1 System configuration example

(1) System configuration of master station

The following modules are assumed to be mounted.

Table 7.1 System configuration of master station

Module	Input signal	Output signal
Q25HCPU	-	-
QJ61BT11N	X00 to X1F	Y00 to Y1F
QX41	X20 to X3F	-

(2) System configuration of MELSEC-ST system

The following modules are assumed to be mounted.
The I/O points sheet is useful for considering the MELSEC-ST system configuration.
(☞ Appendix 3.1 I/O points sheet)

Table 7.2 I/O points sheet

Slice position No.	Start slice No. (No. of occupied slices)	Module name	Br.n	Bw.n	Wr.n	Ww.n	5V DC internal current consumption (Total)	24V DC current (Total)	Slot width (Total)
0	0(2)	ST1H-BT	0	0	0	0	0.410A (0.410A)	0A (0A)	-
1	2(1)	ST1PSD	0	0	0	0	-	-	25.2mm (25.2mm)
2	3(1)	ST1X2-DE1	2	0	0	0	0.085A (0.495A)	*1	12.6mm (37.8mm)
3	4(1)	ST1Y2-TE2	0	2	0	0	0.090A (0.585A)	*1	12.6mm (50.4mm)
4	5(1)	ST1PDD	0	0	0	0	0.060A (0.645A)	-	12.6mm (63.0mm)
5	6(2)	ST1AD2-V	4	4	2	0	0.110A (0.755A)	*1	12.6mm (75.6mm)
6	8(2)	ST1DA2-V	4	4	0	2	0.095A (0.850A)	*1	12.6mm (88.2mm)
Total			10 (252 bits or less)*2	10 (252 bits or less)*2	2 (52 words or less)	2 (52 words or less)	-	-	88.2mm Total (850mm or less)

* 1 The 24V DC current changes depending on the external device connected to each slice module. Check the current consumption of the external device connected to each slice module, and calculate the total value. (☞ MELSEC-ST System User's Manual)
* 2 The available points will decrease by two points for each additional power distribution module.

POINT

In the above MELSEC-ST system configuration, the head module optimizes the number of occupied stations and extended cyclic setting as shown below.
(☞ Section 4.2.2 Auto-optimization of no. of occupied stations and extended cyclic setting)

Number of occupied stations: 1 station occupied, Extended cyclic setting: Single setting

7.2 Settings and Communication Data

After determining the system configuration, set parameters of the programmable controller CPU of the master station.

(1) Setting PLC parameters

Connect GX Developer to the programmable controller CPU of the master station, and set PLC parameters as shown below.

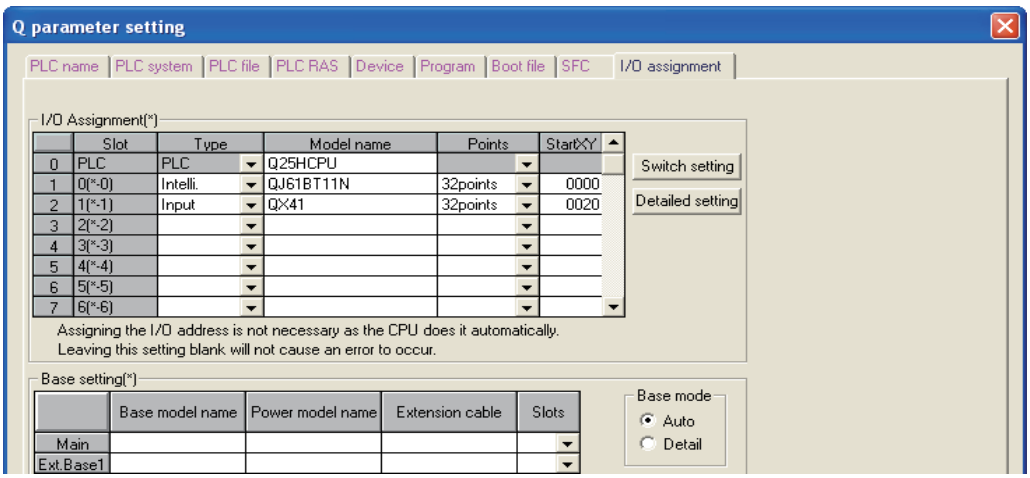


Figure 7.2 PLC parameters (I/O assignment)

(2) Setting network parameters

Connect GX Developer to the programmable controller CPU of the master station, and set network parameters as shown below.

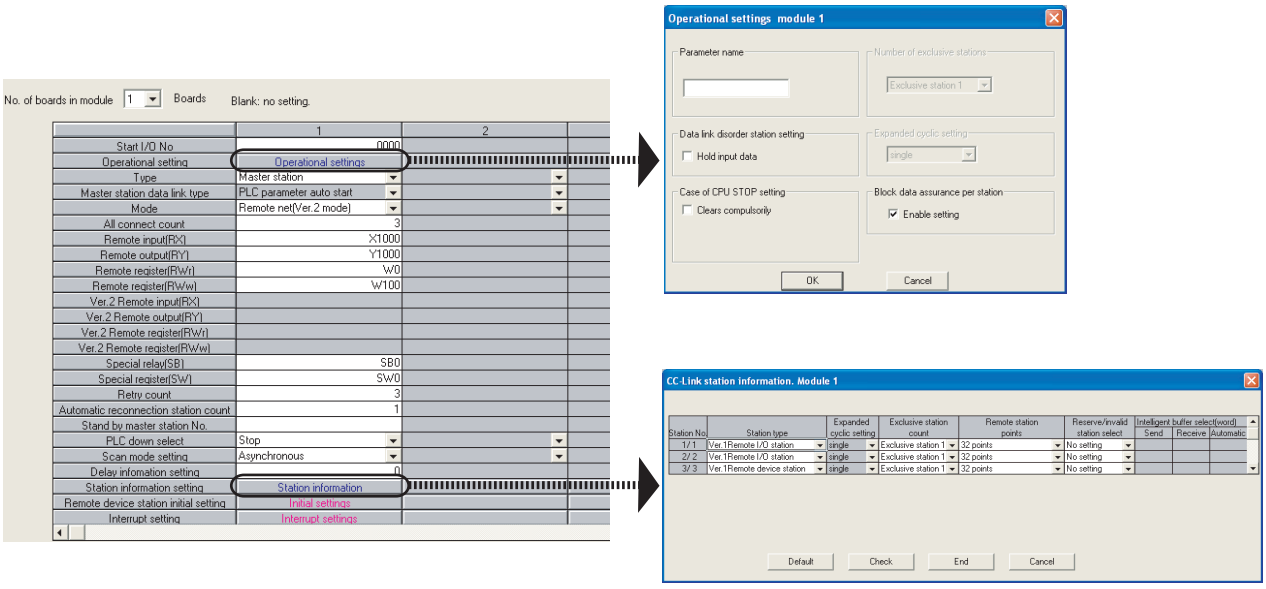


Figure 7.3 Setting network parameters

(3) Communication data

Once network parameters are set, the following I/O data are assigned as follows:

(a) Assignment results of Ver.1 remote I/O stations (station No.1 and No.2)

• Remote input (RX)

Table 7.3 Remote inputs (RX) of station No.1 and No.2

Device	Remote input (RX)	Description
X1000 to X101F	RX0 to RX1F	Remote input (RX) of station No.1
X1020 to X103F	RX20 to RX3F	Remote input (RX) of station No.2

• Remote output (RY)

Table 7.4 Remote outputs (RY) of station No.1 and No.2

Device	Remote output (RY)	Description
Y1000 to Y101F	RY0 to RY1F	Remote output (RY) of station No.1
Y1020 to Y103F	RY20 to RY3F	Remote output (RY) of station No.2

(b) Assignment results of remote device station (MELSEC-ST system) (station No.3)
The assignment sheet is useful for I/O data assignment.
(☞Appendix 3.2 Input data assignment sheet, Appendix 3.3 Output data assignment sheet)

• Remote input (RX)

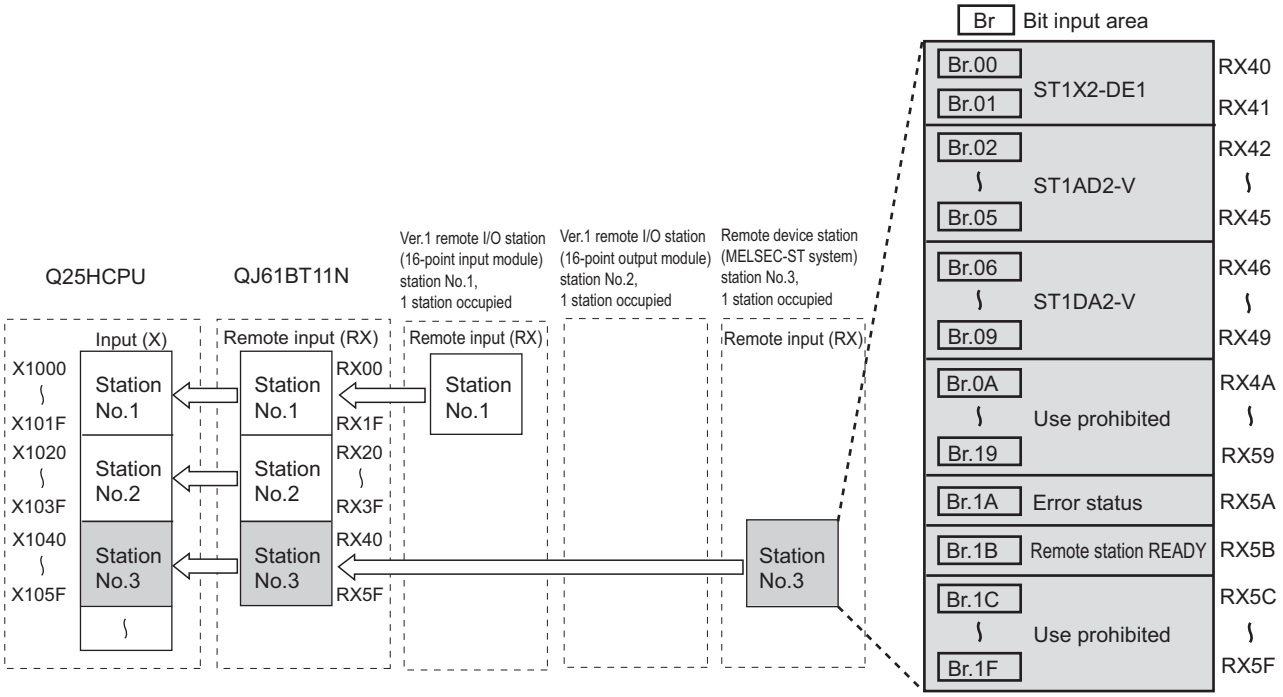


Figure 7.4 Remote input (RX) assignment

Table 7.5 Br Bit input area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote input (RX)	Slice position No.	Module name	Br.n	Data name
X1040	RX40	2	ST1X2-DE1	Br.00	Input status (1st point)
X1041	RX41			Br.01	Input status (2nd point)
X1042	RX42	5	ST1AD2-V	Br.02	Module READY
X1043	RX43			Br.03	Convert setting complete flag
X1044	RX44			Br.04	A/D conversion complete flag
X1045	RX45			Br.05	Alarm output signal
X1046	RX46	6	ST1DA2-V	Br.06	Module READY
X1047	RX47			Br.07	Convert setting complete flag
X1048	RX48			Br.08	Use prohibited
X1049	RX49			Br.09	Use prohibited
X104A	RX4A	-	-	Br.0A	Use prohibited
to		to			
X1059	RX59	-	-	Br.19	Use prohibited
X105A	RX5A	-	-	Br.1A	Error status
X105B	RX5B	-	-	Br.1B	Remote station READY
X105C	RX5C	-	-	Br.1C	Use prohibited
to		to			
X105F	RX5F	-	-	Br.1F	Use prohibited

• Remote output (RY)

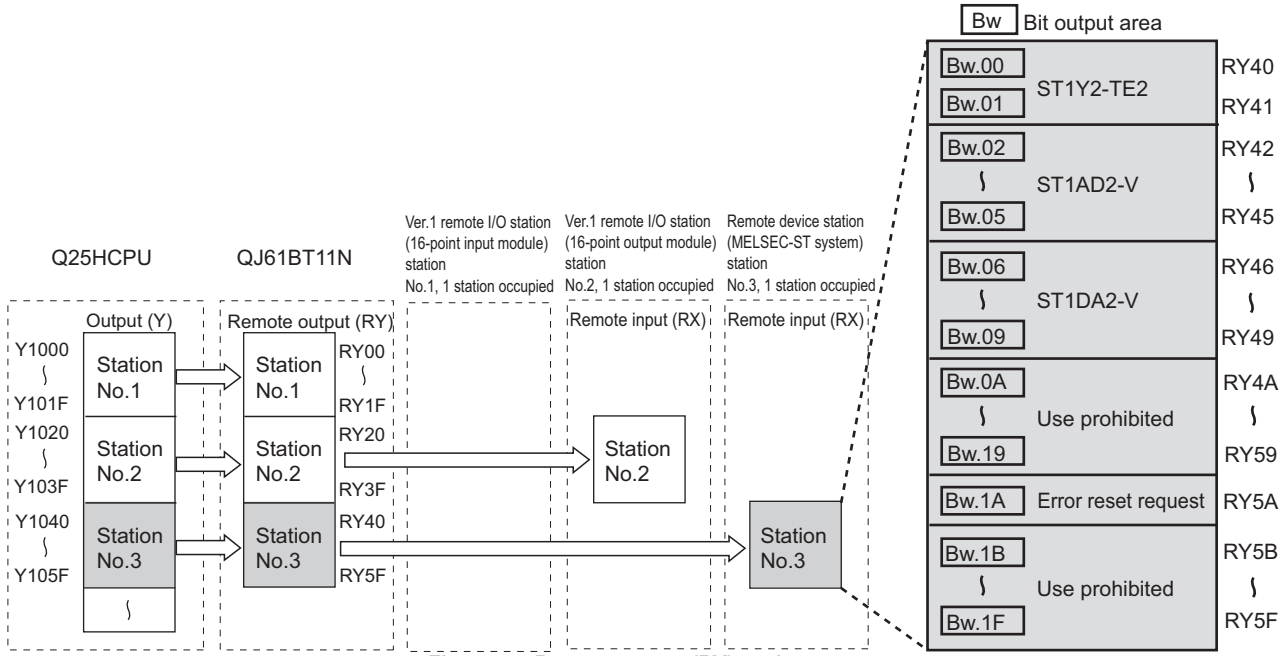


Figure 7.5 Remote output (RY) assignment

Table 7.6 Bw Bit output area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote output (RY)	Slice position No.	Module name	Bw.n	Data name
Y1040	RY40	3	ST1Y2-TE2	Bw.00	Output status (1st point)
Y1041	RY41			Bw.01	Output status (2nd point)
Y1042	RY42	5	ST1AD2-V	Bw.02	Use prohibited
Y1043	RY43			Bw.03	Convert setting request
Y1044	RY44			Bw.04	Use prohibited
Y1045	RY45			Bw.05	Use prohibited
Y1046	RY46	6	ST1DA2-V	Bw.06	Use prohibited
Y1047	RY47			Bw.07	Convert setting request
Y1048	RY48			Bw.08	CH1 output enable/disable flag
Y1049	RY49			Bw.09	CH2 output enable/disable flag
Y104A	RY4A	-	-	Bw.0A	Use prohibited
to		to			
Y1059	RY59	-	-	Bw.19	Use prohibited
Y105A	RY5A	-	-	Bw.1A	Error reset request
Y105B	RY5B	-	-	Bw.1B	Use prohibited
to		to			
Y105F	RY5F	-	-	Bw.1F	Use prohibited

• Remote register (RWr)

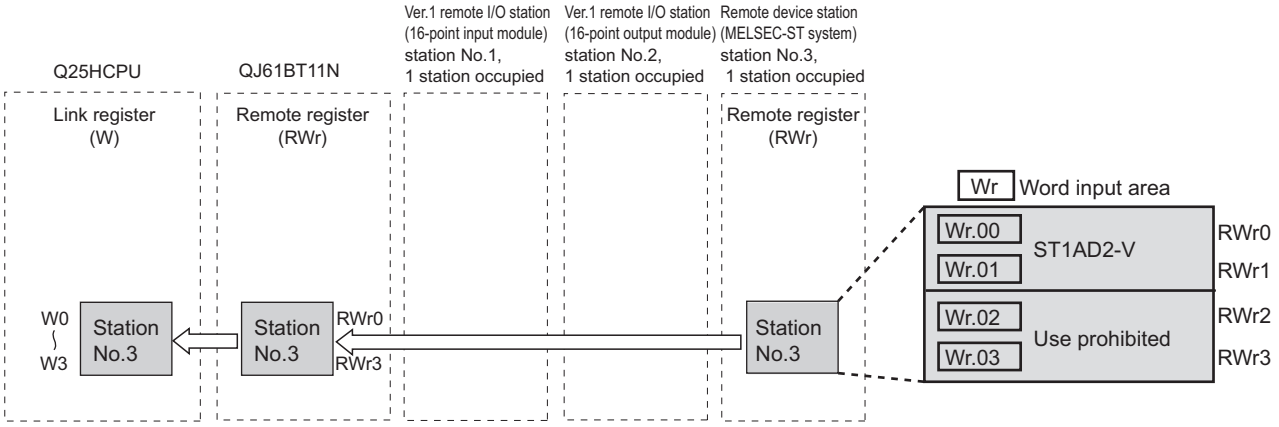


Figure 7.6 Remote register (RWr) assignment

Table 7.7 Wr Word input area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote register (RWr)	Slice position No.	Module name	Wr.n	Data name
W0	RWr0	5	ST1AD2-V	Wr.00	CH1 digital output value
W1	RWr1			Wr.01	CH2 digital output value
W2	RWr2	-	-	Wr.02	Use prohibited
W3	RWr3			Wr.03	Use prohibited

• Remote register (RWw)

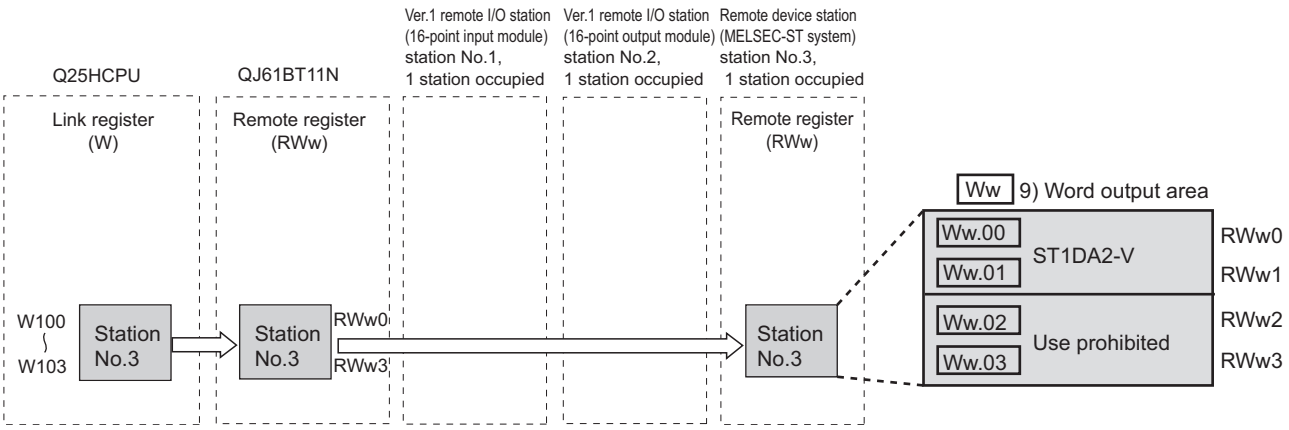


Figure 7.7 Remote register (RWw) assignment

Table 7.8 Ww Word output area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote register (RWw)	Slice position No.	Module name	Ww.n	Data name
W100	RWw0	6	ST1DA2-V	Ww.00	CH1 digital value setting
W101	RWw1			Ww.01	CH2 digital value setting
W102	RWw2	-	-	Ww.02	Use prohibited
W103	RWw3			Ww.03	Use prohibited

7.3 Program Examples

This section provides program examples.

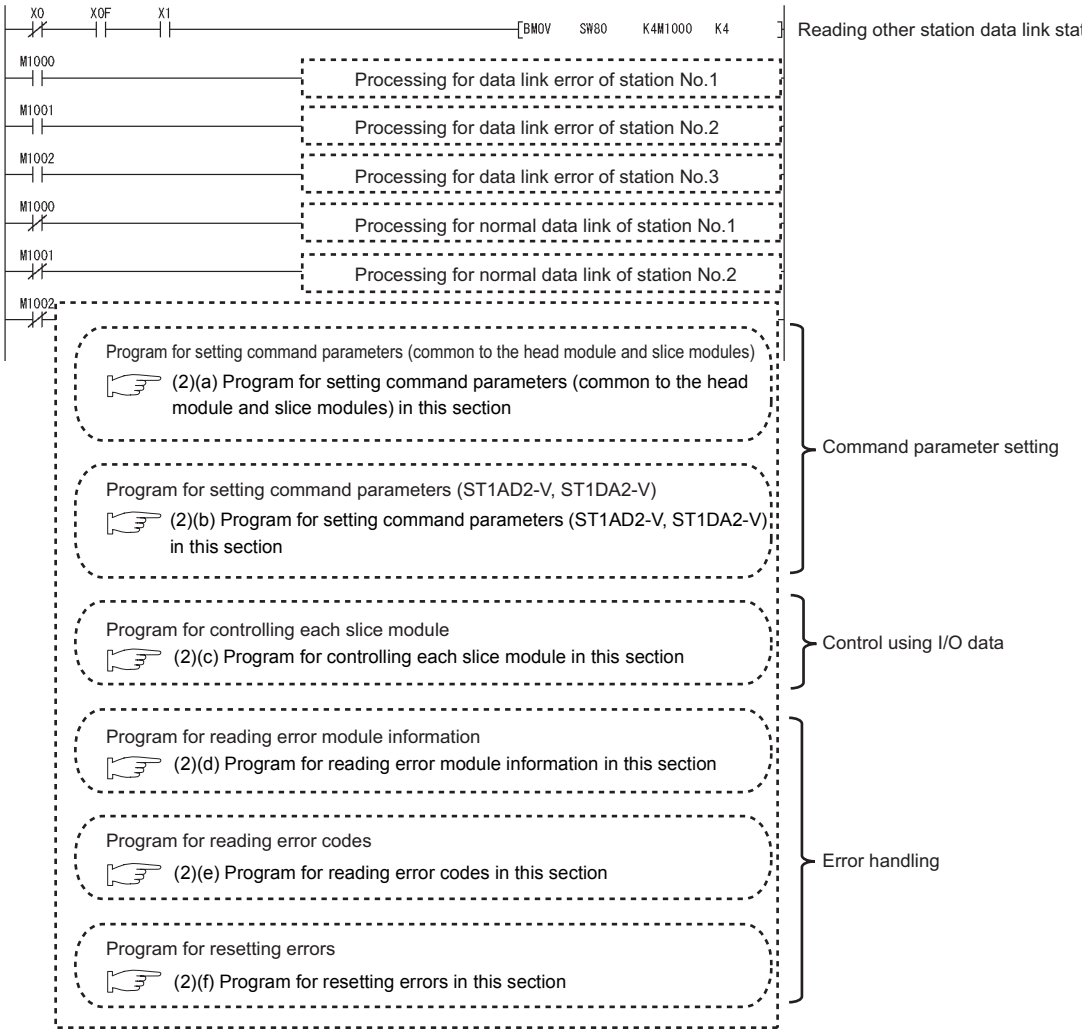

X0
X0F
X1
BMOV SW80 K4M1000 K4
Reading other station data link status
M1000
Processing for data link error of station No.1
M1001
Processing for data link error of station No.2
M1002
Processing for data link error of station No.3
M1000
Processing for normal data link of station No.1
M1001
Processing for normal data link of station No.2
M1002
Program for setting command parameters (common to the head module and slice modules)
(2)(a) Program for setting command parameters (common to the head module and slice modules) in this section
Program for setting command parameters (ST1AD2-V, ST1DA2-V)
(2)(b) Program for setting command parameters (ST1AD2-V, ST1DA2-V) in this section
Command parameter setting
Program for controlling each slice module
(2)(c) Program for controlling each slice module in this section
Control using I/O data
Program for reading error module information
(2)(d) Program for reading error module information in this section
Program for reading error codes
(2)(e) Program for reading error codes in this section
Program for resetting errors
(2)(f) Program for resetting errors in this section
Error handling

Figure 7.8 Program examples

(1) Device assignments in program examples

The devices used common to the program examples in (2) in this section are shown below.

For devices used for each program example, refer to the following.

☞ (2) Program examples in this section

(a) Special relay (SM) and special register (SD)

Table 7.9 Special relay (SM) and special register (SD)

Device	Application	Device	Application
SM0	Diagnostic error	SD0	Diagnostic error

(b) Devices used by the QJ61BT11N

Table 7.10 Devices used by the QJ61BT11N

Device	Application	Device	Application
X00	Module error	-	
X01	Own data link status		
X0F	Module ready		
SB0 to SB1FF	Link special relay (SB) of the QJ61BT11N	SW0 to SW1FF	Link special register (SW) of the QJ61BT11N

(c) Devices used by the user

Table 7.11 Devices for checking Other station data link status

Device	Application	Device	Application
M1000	Other station data link status (Station No.1)	M1002	Other station data link status (Station No.3)
M1001	Other station data link status (Station No.2)	-	

(2) Program examples

(a) Program for setting command parameters (common to the head module and slice modules)

Execute Initial data individual write request (command No.: 8107H) with the dedicated instruction of the master station (RDMSG) to set command parameters.

1) Setting details of command parameters

In this program, the following command parameters are set.

Table 7.12 Setting details of command parameters

Item		Setting	Reference section
ST1H-BT	Output status at module error	Stop	Section 4.3.1
	Consistency function	Enable	Section 4.2.3
ST1X2-DE1	Response time	1.5ms	MELSEC-ST System User's Manual
ST1Y2-TE2	Clear/Hold setting	Clear	
ST1AD2-V	Input range setting	-10 to 10V	Manual of intelligent function module
ST1DA2-V	CH1/CH2 Clear/Hold/Preset setting	Preset	
	CH1/CH2 Output range setting	-10 to 10V	

2) Device assignments in the program example

Table 7.13 Command parameter setting

Device	Application	Device	Application
M15	Completion device	D100 to D104	Control data
M16	Completion status indicator device	D600 to D618	Send data (execution data of the command)
M210	Command parameter write request	D800 to D808	Receive data (result data of the command)

3) Program example

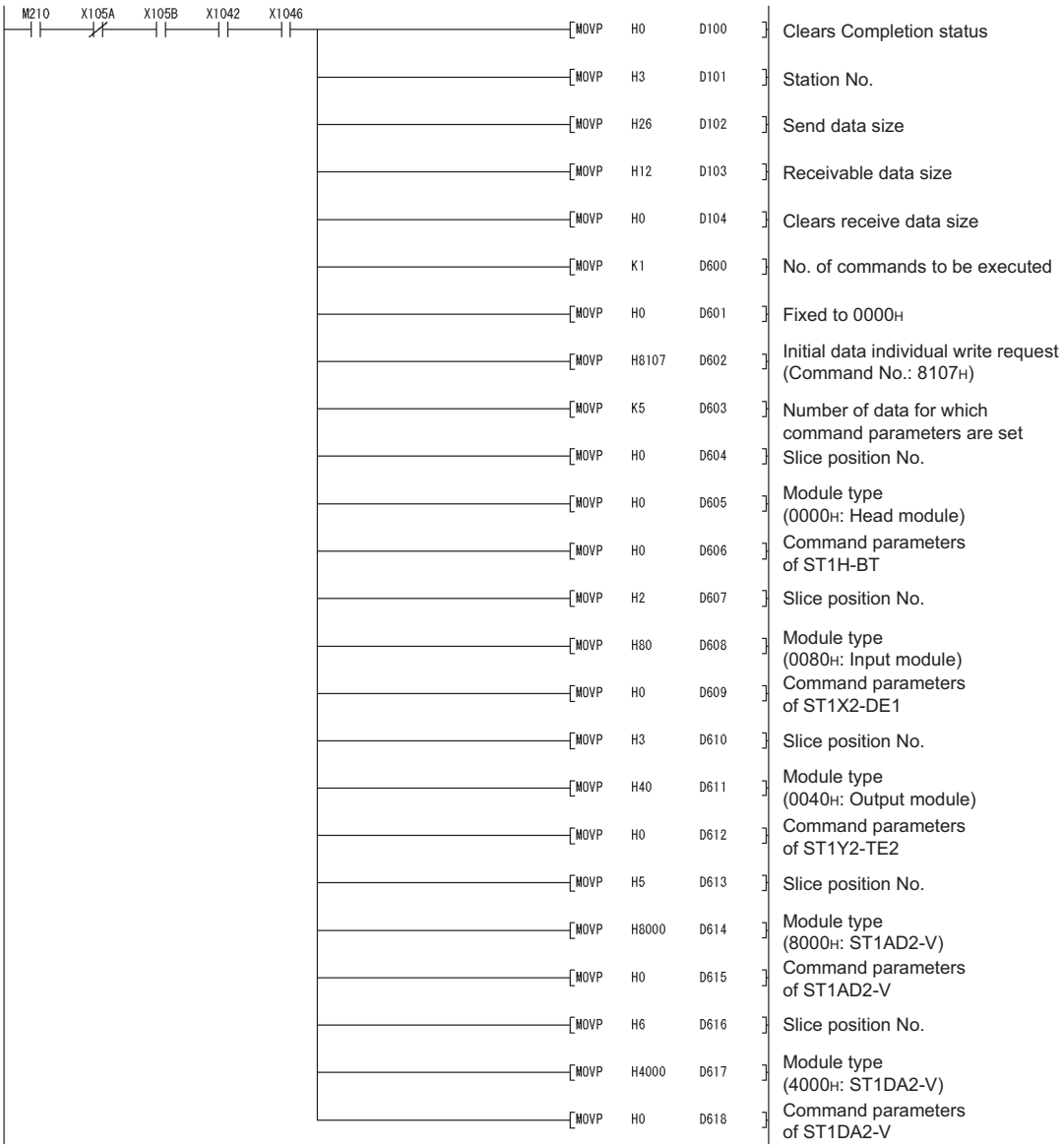


Figure 7.9 Program for setting command parameters (common to head module and slice modules)

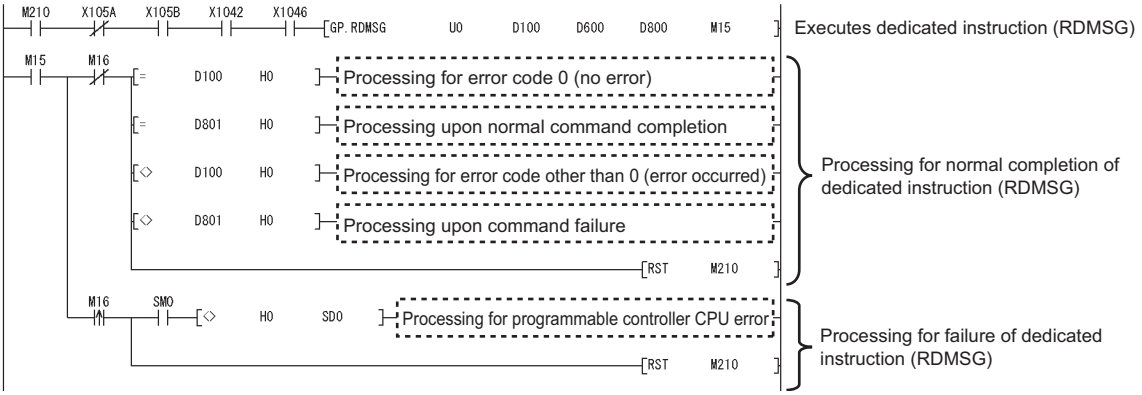


Figure 7.9 Program for setting command parameters (common to head module and slice modules) (continued)

(b) Program for setting command parameters (ST1AD2-V, ST1DA2-V)
Execute command parameters of intelligent function modules with the dedicated instruction of the master station (RDMSG instruction) to set command parameters.

1) Setting details of command parameters
In this program, the following command parameters are set for CH1 of the ST1AD2-V and ST1DA2-V.

Table 7.14 Setting details of command parameters

Item		Setting	Reference section
ST1AD2-V	A/D conversion enable/disable setting	A/D conversion enabled	MELSEC-ST Analog-Digital Converter Module User's Manual (CC-Link)
	Time/number of times specification, Sampling process/averaging process setting	Time/number of times specification: Time Sampling process/averaging process setting: Averaging process	
	Average time/average number of times setting	500ms	
	Alarm output setting	Alarm output processing enabled	
	Disconnection detection setting	Disconnection detection enabled	
	Upper upper limit value, Upper lower limit value	Upper upper limit value: 3000 Upper lower limit value: 2500	
	Lower upper limit value, Lower lower limit value	Lower upper limit value: 200 Lower lower limit value: 100	
	50/60Hz notch filter specification	Notch filtering for all channels (60 ± 3Hz)	
ST1DA2-V	D/A conversion enable/disable setting	D/A conversion enabled	MELSEC-ST Digital-Analog Converter Module User's Manual (CC-Link)
	Preset value	3000	

2) Device assignments in the program example

Table 7.15 Command parameter setting (ST1AD2-V, ST1DA2-V)

Device	Application	Device	Application
M21	Completion device for ST1AD2-V	M221	Command parameter write request for ST1DA2-V
M22	Completion status indicator device for ST1AD2-V	D110 to D114	Control data
M25	Completion device for ST1DA2-V	D1000 to D1024	Send data for ST1AD2-V (execution data of the command)
M26	Completion status indicator device for ST1DA2-V	D1100 to D1108	Send data for ST1DA2-V (execution data of the command)
M220	Command parameter write request for ST1AD2-V	D2000 to D2024	Receive data for ST1AD2-V (result data of the command)
-		D2100 to D2108	Receive data for ST1DA2-V (result data of the command)

3) Program example

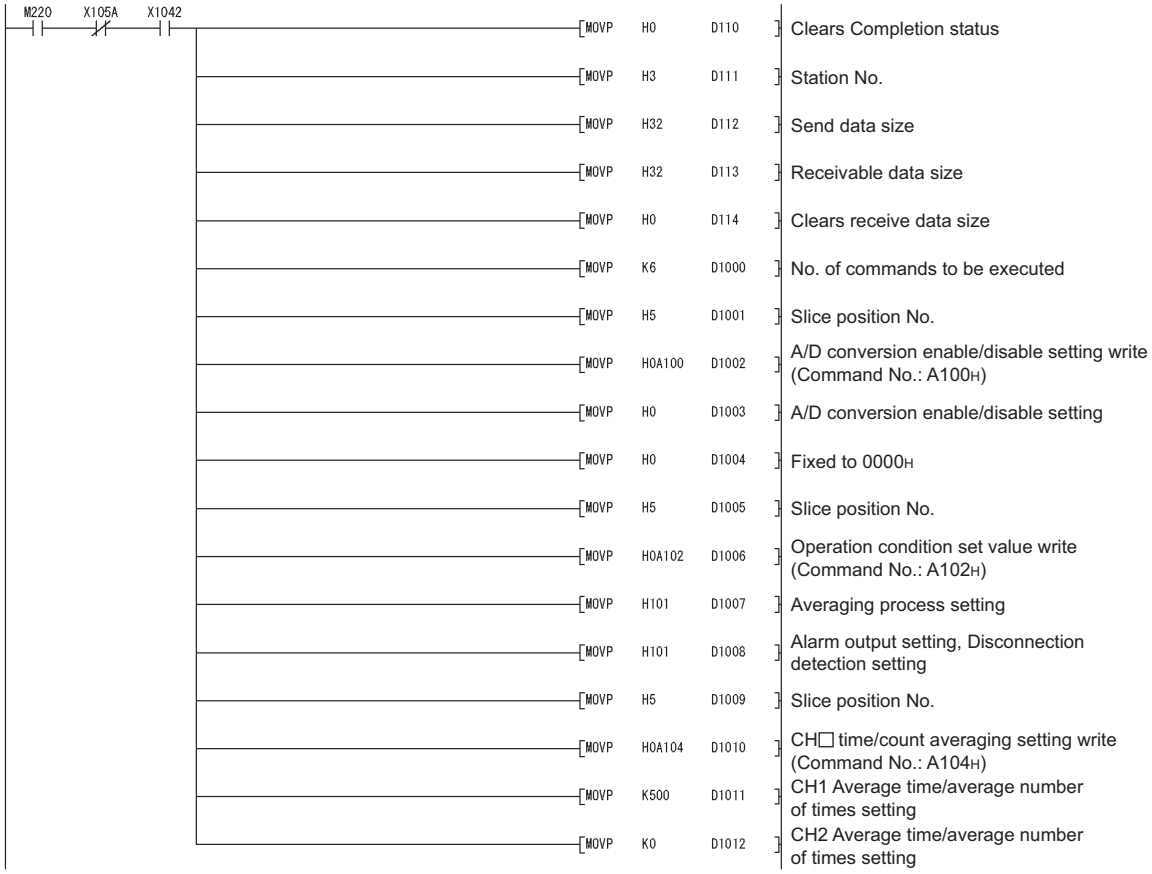

M220
X105A
X1042
MOVP H0 D110 Clears Completion status
MOVP H3 D111 Station No.
MOVP H32 D112 Send data size
MOVP H32 D113 Receivable data size
MOVP H0 D114 Clears receive data size
MOVP K6 D1000 No. of commands to be executed
MOVP H5 D1001 Slice position No.
MOVP H0A100 D1002 A/D conversion enable/disable setting write (Command No.: A100H)
MOVP H0 D1003 A/D conversion enable/disable setting
MOVP H0 D1004 Fixed to 0000H
MOVP H5 D1005 Slice position No.
MOVP H0A102 D1006 Operation condition set value write (Command No.: A102H)
MOVP H101 D1007 Averaging process setting
MOVP H101 D1008 Alarm output setting, Disconnection detection setting
MOVP H5 D1009 Slice position No.
MOVP H0A104 D1010 CH□ time/count averaging setting write (Command No.: A104H)
MOVP K500 D1011 CH1 Average time/average number of times setting
MOVP K0 D1012 CH2 Average time/average number of times setting

Figure 7.10 Program for setting command parameters (ST1AD2-V)

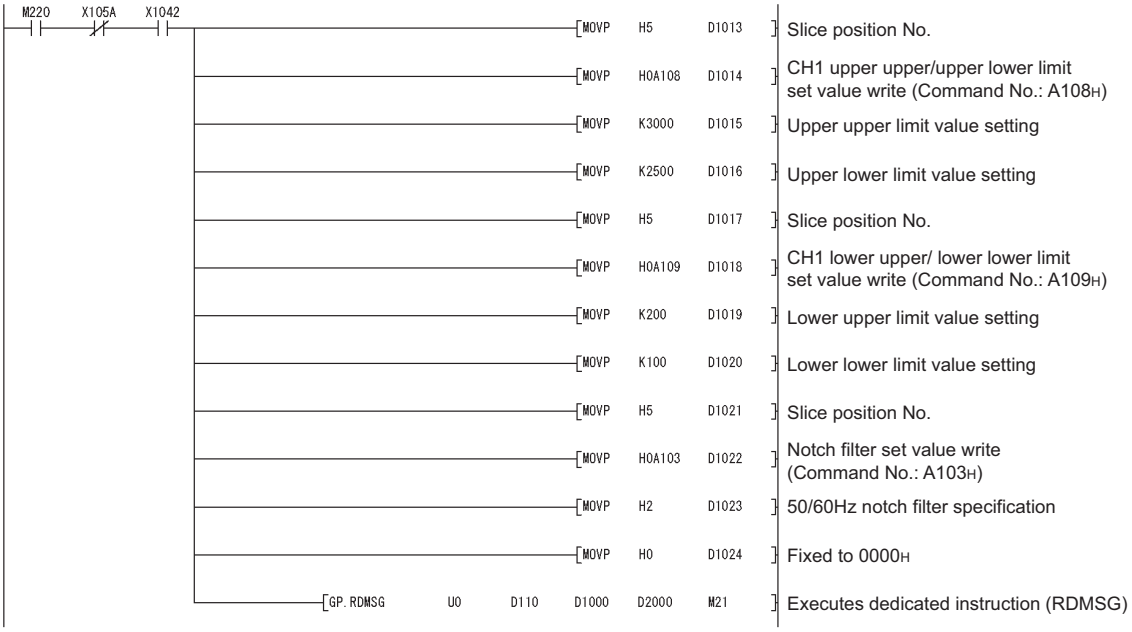

M220
X105A
X1042
MOVP H5 D1013
Slice position No.
MOVP H0A108 D1014
CH1 upper upper/upper lower limit set value write (Command No.: A108H)
MOVP K3000 D1015
Upper upper limit value setting
MOVP K2500 D1016
Upper lower limit value setting
MOVP H5 D1017
Slice position No.
MOVP H0A109 D1018
CH1 lower upper/ lower lower limit set value write (Command No.: A109H)
MOVP K200 D1019
Lower upper limit value setting
MOVP K100 D1020
Lower lower limit value setting
MOVP H5 D1021
Slice position No.
MOVP H0A103 D1022
Notch filter set value write (Command No.: A103H)
MOVP H2 D1023
50/60Hz notch filter specification
MOVP H0 D1024
Fixed to 0000H
GP.RDMSG U0 D110 D1000 D2000 M21
Executes dedicated instruction (RDMSG)

Figure 7.10 Program for setting command parameters (ST1AD2-V) (continued)

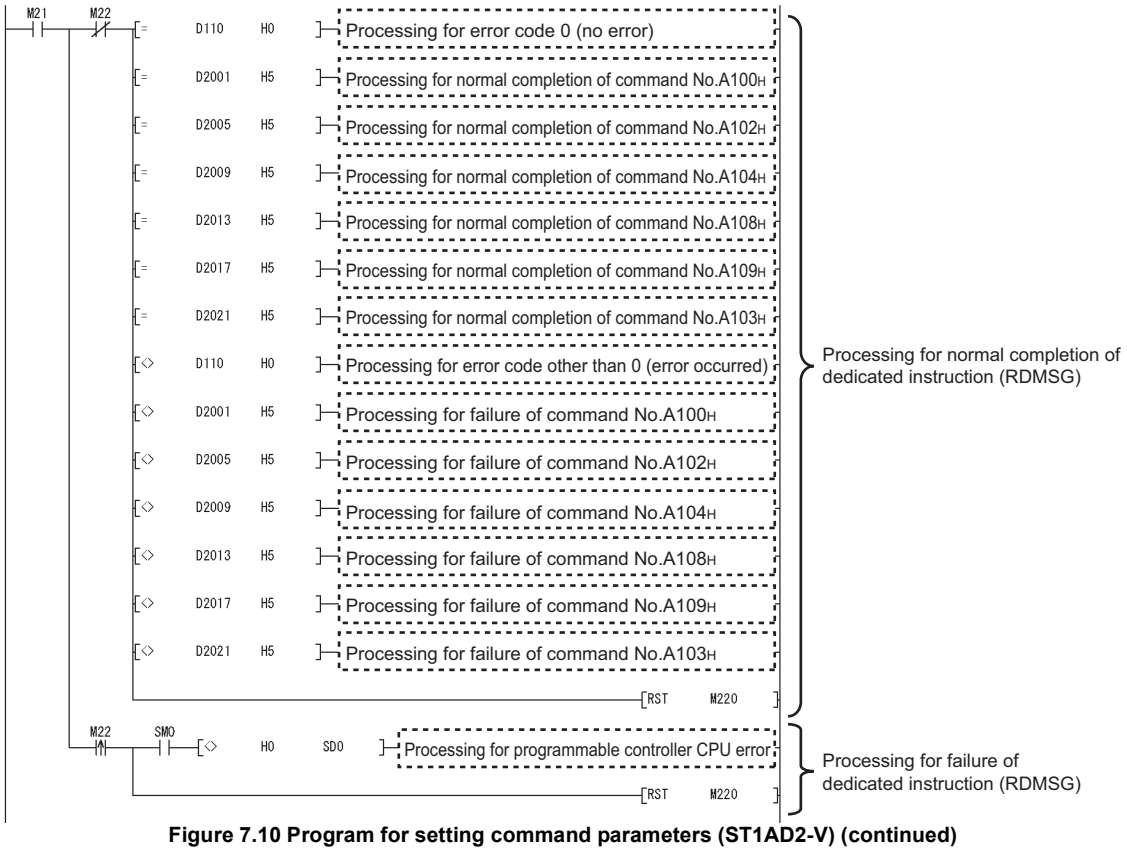

M21
M22
D110 H0
Processing for error code 0 (no error)
D2001 H5
Processing for normal completion of command No.A100H
D2005 H5
Processing for normal completion of command No.A102H
D2009 H5
Processing for normal completion of command No.A104H
D2013 H5
Processing for normal completion of command No.A108H
D2017 H5
Processing for normal completion of command No.A109H
D2021 H5
Processing for normal completion of command No.A103H
D110 H0
Processing for error code other than 0 (error occurred)
D2001 H5
Processing for failure of command No.A100H
D2005 H5
Processing for failure of command No.A102H
D2009 H5
Processing for failure of command No.A104H
D2013 H5
Processing for failure of command No.A108H
D2017 H5
Processing for failure of command No.A109H
D2021 H5
Processing for failure of command No.A103H
RST M220
Processing for normal completion of dedicated instruction (RDMSG)
M22
SM0
H0 SD0
Processing for programmable controller CPU error
RST M220
Processing for failure of dedicated instruction (RDMSG)

Figure 7.10 Program for setting command parameters (ST1AD2-V) (continued)

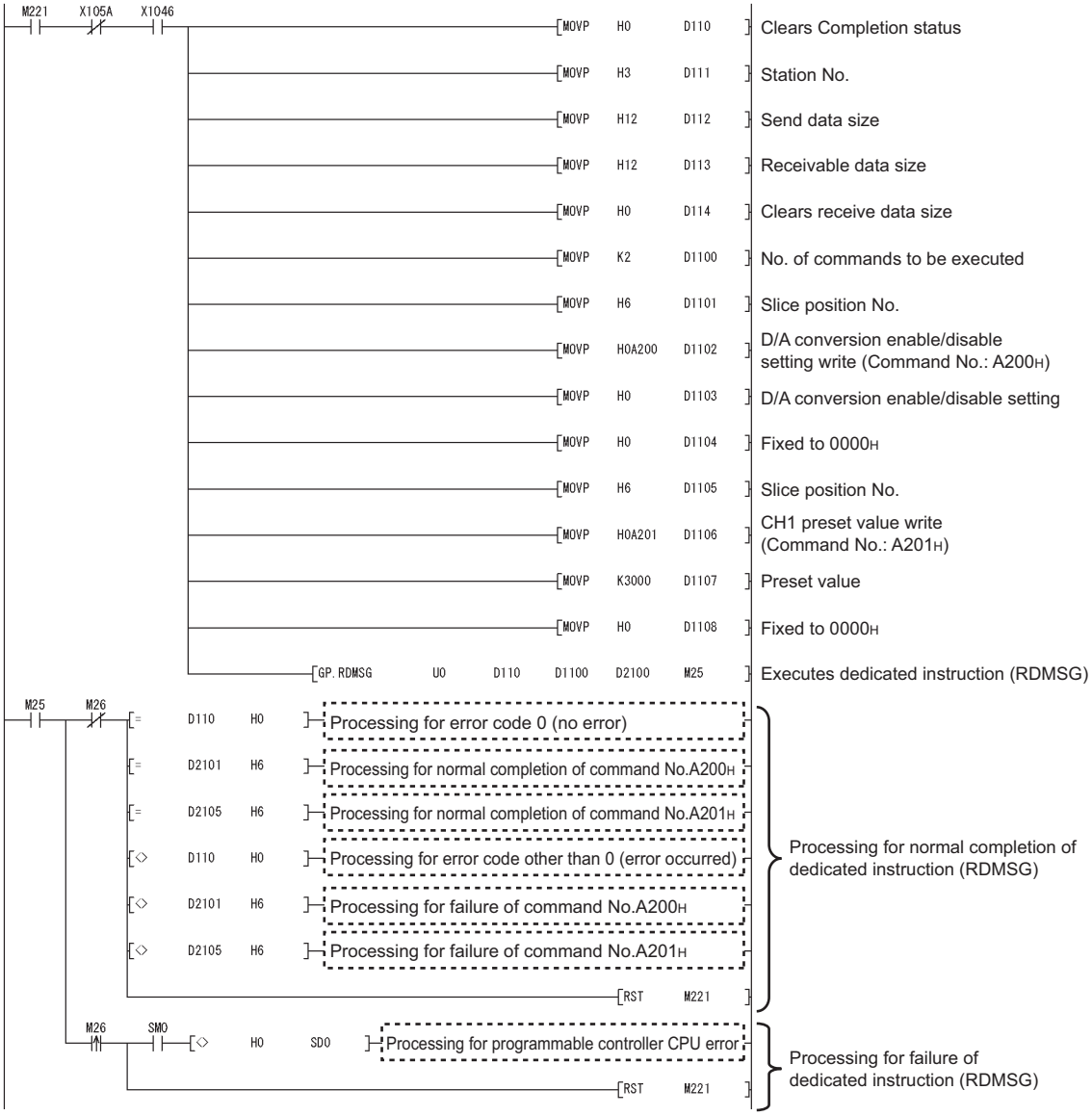

M221 X105A X1046
MOVP H0 D110 Clears Completion status
MOVP H3 D111 Station No.
MOVP H12 D112 Send data size
MOVP H12 D113 Receivable data size
MOVP H0 D114 Clears receive data size
MOVP K2 D1100 No. of commands to be executed
MOVP H6 D1101 Slice position No.
MOVP H0A200 D1102 D/A conversion enable/disable setting write (Command No.: A200H)
MOVP H0 D1103 D/A conversion enable/disable setting
MOVP H0 D1104 Fixed to 0000H
MOVP H6 D1105 Slice position No.
MOVP H0A201 D1106 CH1 preset value write (Command No.: A201H)
MOVP K3000 D1107 Preset value
MOVP H0 D1108 Fixed to 0000H
GP. RDMSG U0 D110 D1100 D2100 M25 Executes dedicated instruction (RDMSG)
M25 M26
= D110 H0 Processing for error code 0 (no error)
= D2101 H6 Processing for normal completion of command No.A200H
= D2105 H6 Processing for normal completion of command No.A201H
<> D110 H0 Processing for error code other than 0 (error occurred)
<> D2101 H6 Processing for failure of command No.A200H
<> D2105 H6 Processing for failure of command No.A201H
RST M221
Processing for normal completion of dedicated instruction (RDMSG)
M26 SM0
<> H0 SD0 Processing for programmable controller CPU error
RST M221
Processing for failure of dedicated instruction (RDMSG)

Figure 7.11 Program for setting command parameters (ST1DA2-V)

(c) Program for controlling each slice module
The program controls each slice module with I/O data.

1) Device assignments in the program example

Table 7.16 Devices for controlling each slice module

Device	Application	Device	Application
M30	ST1AD2-V convert setting request flag	M40	ST1Y2-TE2 Output processing to the first input point.
M31	ST1DA2-V convert setting request flag	M41	ST1Y2-TE2 Output processing to the second input point.

2) Program example

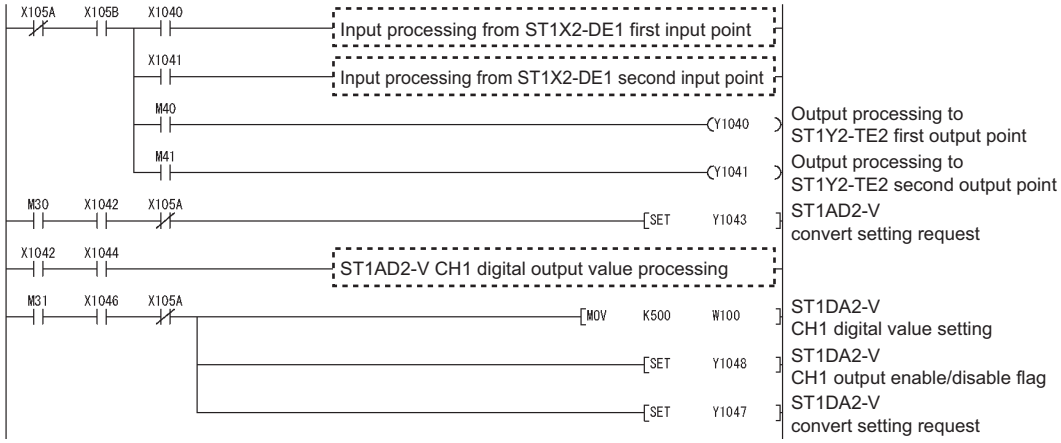


Figure 7.12 Program for controlling each slice module

(d) Program for reading error module information

Execute Error module information read request (command No.: 0103H) with the dedicated instruction of the master station (RDMSG instruction) to read the error module information.

1) Device assignments in the program example

Table 7.17 Reading error module information

Device	Application	Device	Application
M51	Completion device	D120 to D124	Control data
M52	Completion status indicator device	D1200 to D1204	Send data (execution data of the command)
M250	Error module information storage enable flag	D2200 to D2218	Receive data (result data of the command)
-		D3000	Error module information

2) Program example

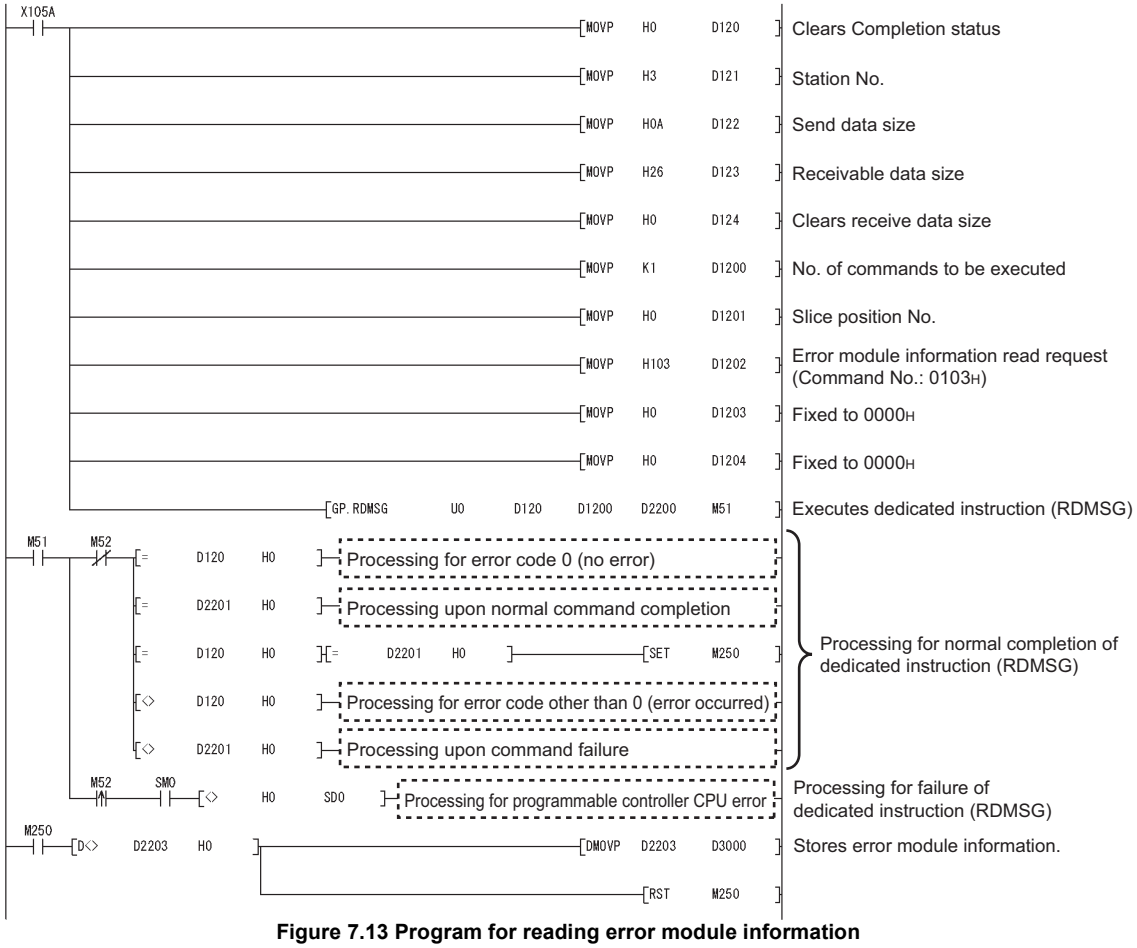


Figure 7.13 Program for reading error module information

(e) Program for reading error codes

Execute Error code read request (command No.: 8101H/0101H) with the dedicated instruction of the master station (RDMSG instruction) to read an error code.

1) Device assignments in the program example

Table 7.18 Error code reading

Device	Application	Device	Application
M61	Completion device	D130 to D134	Control data
M62	Completion status indicator device	D1300 to D1328	Send data (execution data of the command)
M70	ST1H-BT error code storage enable flag	D2300 to D2328	Receive data (result data of the command)
M71	ST1PSD error code storage enable flag	D3000	Error module information
M72	ST1X2-DE1 error code storage enable flag	D3030	Error code of ST1H-BT
M73	ST1Y2-TE2 error code storage enable flag	D3031	Error code of ST1PSD
M74	ST1PDD error code storage enable flag	D3032	Error code of ST1X2-DE1
M75	ST1AD2-V error code storage enable flag	D3033	Error code of ST1Y2-TE2
M76	ST1DA2-V error code storage enable flag	D3034	Error code of ST1PDD
-		D3035	Error code of ST1AD2-V
		D3036	Error code of ST1DA2-V

2) Program example

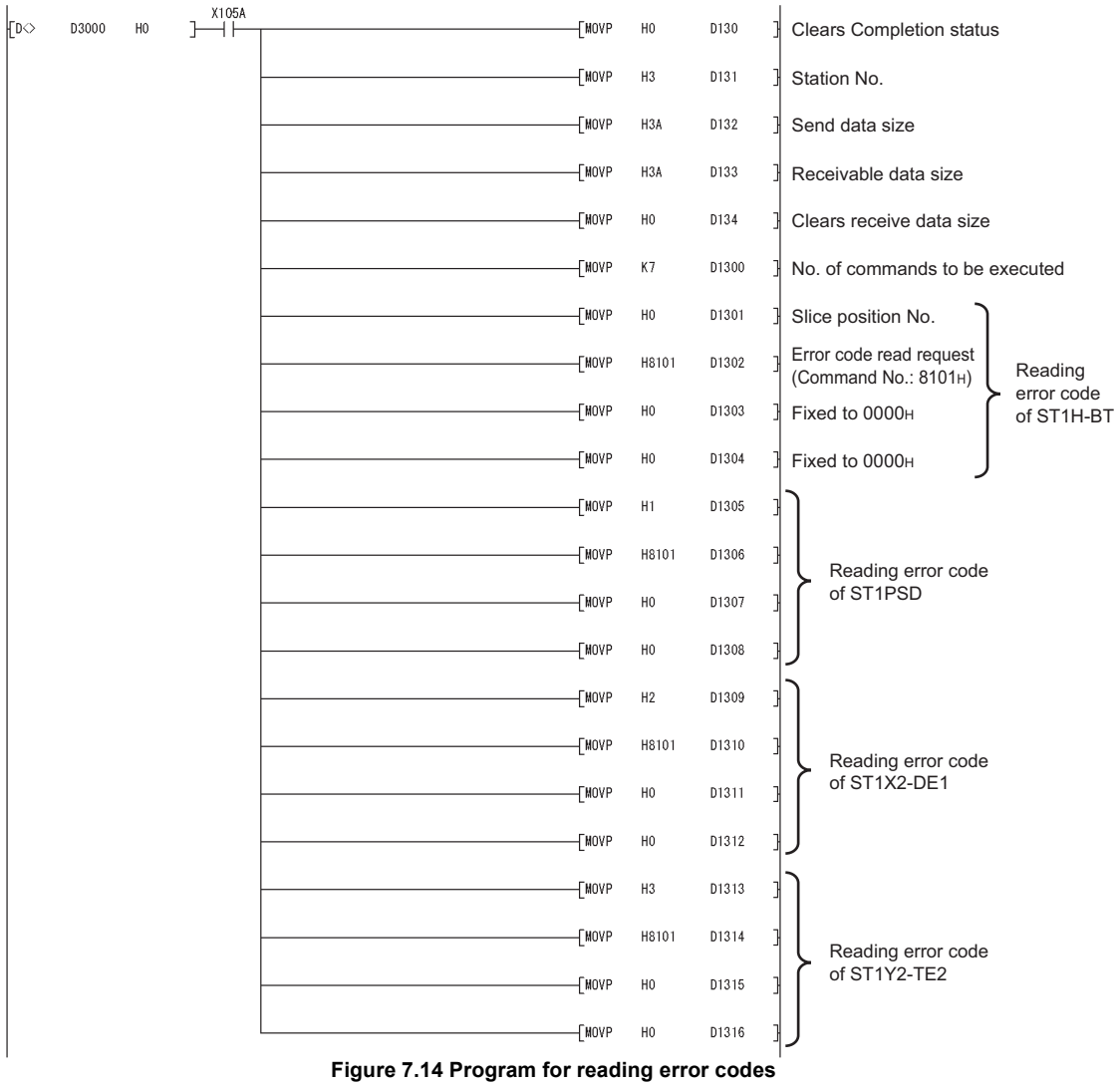

X105A
[D◇ D3000 H0
[MOVP H0 D130] Clears Completion status
[MOVP H3 D131] Station No.
[MOVP H3A D132] Send data size
[MOVP H3A D133] Receivable data size
[MOVP H0 D134] Clears receive data size
[MOVP K7 D1300] No. of commands to be executed
[MOVP H0 D1301] Slice position No.
[MOVP H8101 D1302] Error code read request (Command No.: 8101H)
[MOVP H0 D1303] Fixed to 0000H
[MOVP H0 D1304] Fixed to 0000H
Reading error code of ST1H-BT
[MOVP H1 D1305]
[MOVP H8101 D1306]
[MOVP H0 D1307]
[MOVP H0 D1308]
Reading error code of ST1PSD
[MOVP H2 D1309]
[MOVP H8101 D1310]
[MOVP H0 D1311]
[MOVP H0 D1312]
Reading error code of ST1X2-DE1
[MOVP H3 D1313]
[MOVP H8101 D1314]
[MOVP H0 D1315]
[MOVP H0 D1316]
Reading error code of ST1Y2-TE2

Figure 7.14 Program for reading error codes

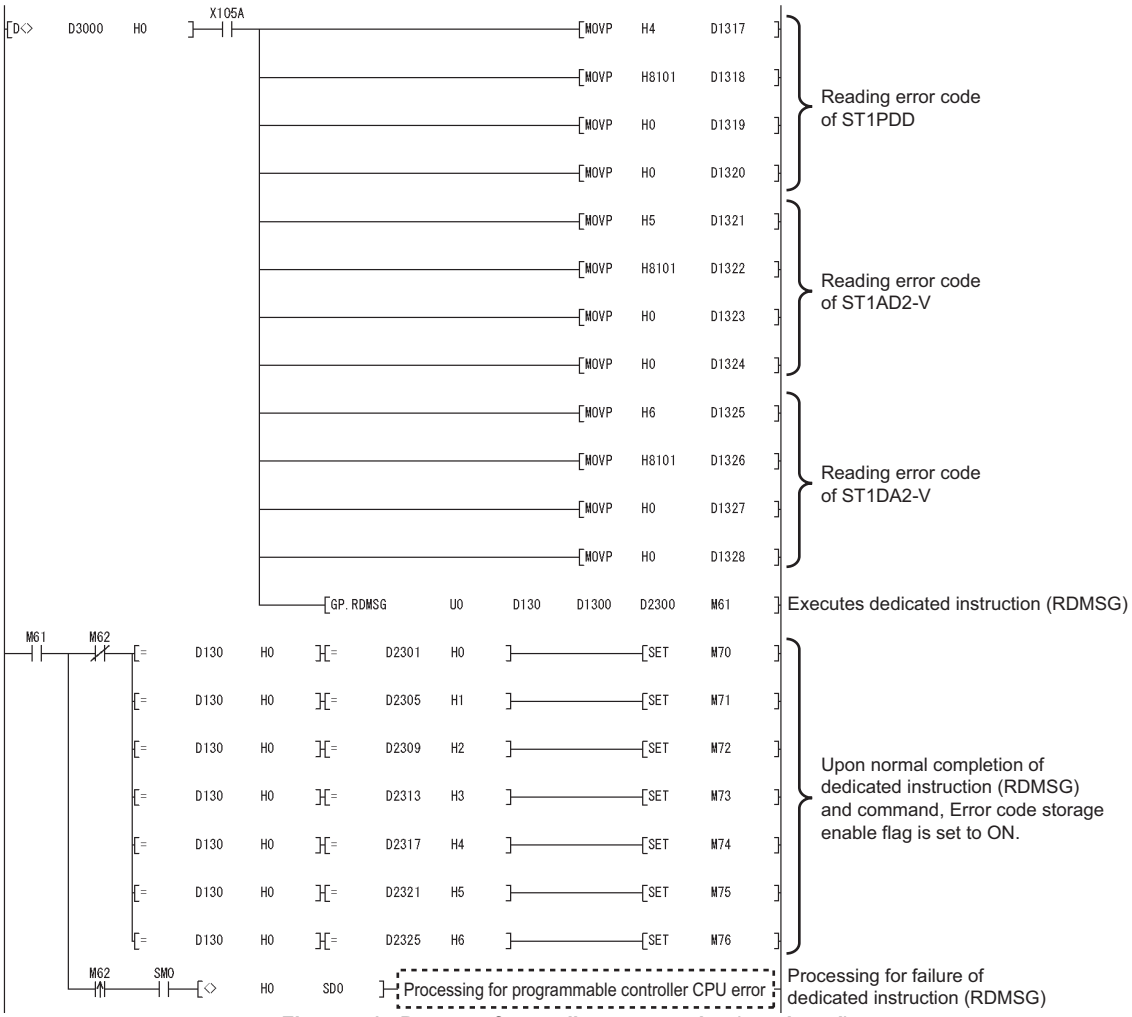

X105A
D<> D3000 H0
MOVP H4 D1317
MOVP H8101 D1318
MOVP H0 D1319
MOVP H0 D1320
Reading error code of ST1PDD
MOVP H5 D1321
MOVP H8101 D1322
MOVP H0 D1323
MOVP H0 D1324
Reading error code of ST1AD2-V
MOVP H6 D1325
MOVP H8101 D1326
MOVP H0 D1327
MOVP H0 D1328
Reading error code of ST1DA2-V
GP.RDMSG U0 D130 D1300 D2300 M61
Executes dedicated instruction (RDMSG)
M61 M62
= D130 H0 = D2301 H0 SET M70
= D130 H0 = D2305 H1 SET M71
= D130 H0 = D2309 H2 SET M72
= D130 H0 = D2313 H3 SET M73
= D130 H0 = D2317 H4 SET M74
= D130 H0 = D2321 H5 SET M75
= D130 H0 = D2325 H6 SET M76
Upon normal completion of dedicated instruction (RDMSG) and command, Error code storage enable flag is set to ON.
M62 SM0 <> H0 SD0
Processing for programmable controller CPU error
Processing for failure of dedicated instruction (RDMSG)

Figure 7.14 Program for reading error codes (continued)

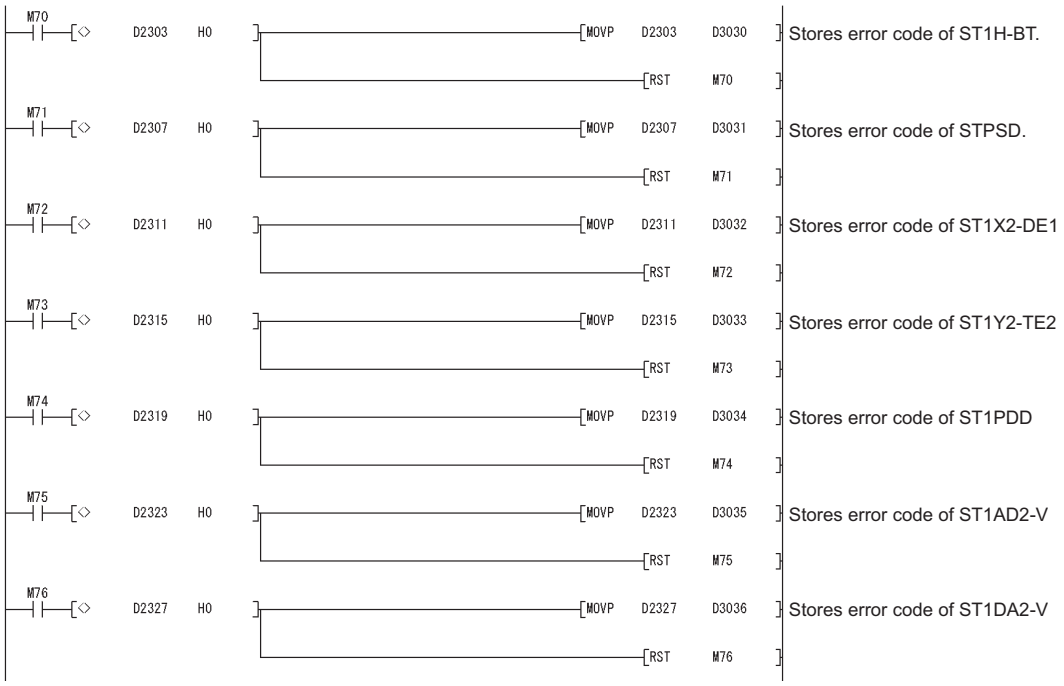


Figure 7.14 Program for reading error codes (continued)

(f) Program for resetting errors

Execute Error clear request (command No.: 8104H/0104H) with the dedicated instruction of the master station (RDMSG instruction) to reset errors.

1) Device assignments in the program example

Table 7.19 Error module information reading

Device	Application	Device	Application
M81	Completion device	D140 to D144	Control data
M82	Completion status indicator device	D1400 to D1406	Send data (execution data of the command)
M270	Error reset request	D2400 to D2404	Receive data (result data of the command)

2) Program example

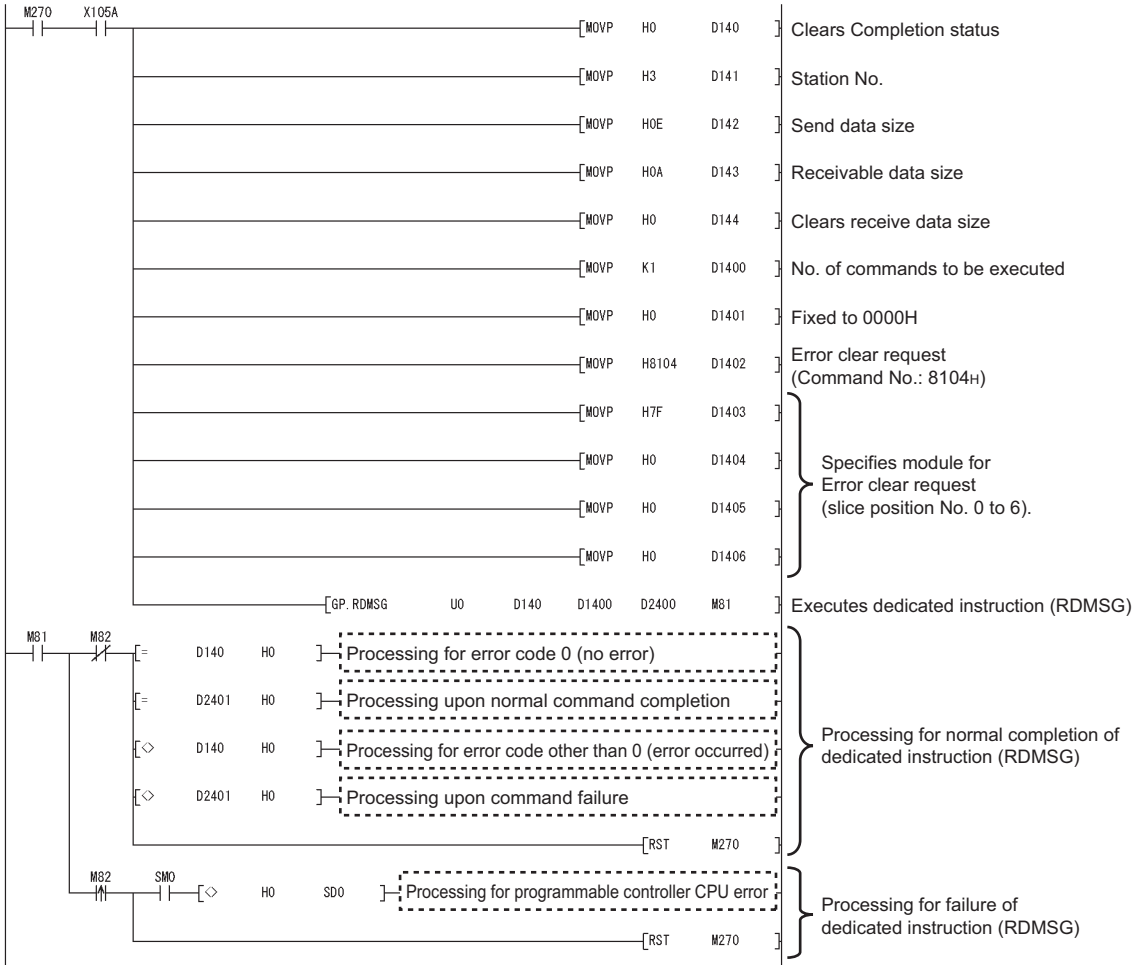


Figure 7.15 Program for resetting errors

CHAPTER8 COMMANDS

This chapter explains the commands that are executed in the head module and each slice module.
The commands can be used for command parameter setting and error code reading.
(☞ Section 8.2 (1) Command list)

8.1 Command Execution Method and Procedures

This section describes the command execution method and procedures.

(1) Command execution method

A command is executed by transmitting a message to the MELSEC-ST system with the dedicated instruction of the master station (RDMSG instruction).

With one dedicated instruction (RDMSG), up to eight commands can be executed at the same time.
Since multiple dedicated instructions (RDMSG) need not be used, it is convenient for the following cases:

- Reading error codes from multiple slice modules,
- Setting parameters to multiple slice modules,

etc.

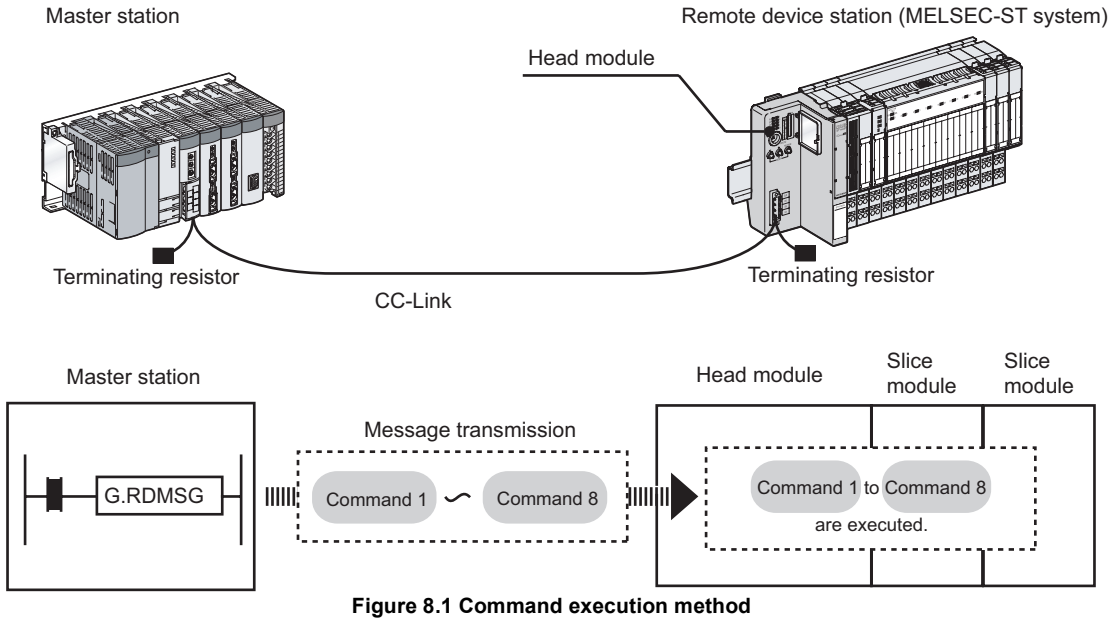


Figure 8.1 Command execution method

(2) Dedicated instruction of the master station (RDMSG instruction)

The following explains the format and arguments of the dedicated instruction (RDMSG).

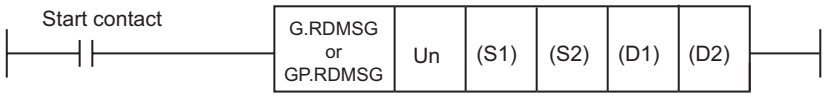


Figure 8.2 Instruction format

(a) Un

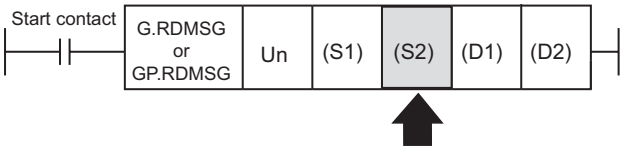
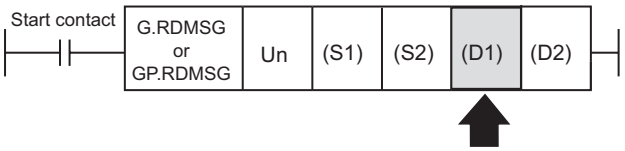
Specify the start I/O No. of the master module. (Setting range: 0 to FEH)

(b) (S1)

Specify the start device of the programmable controller CPU, in which control data are stored.

Control data are stored as shown below.

Table 8.1 Control data

Device	Item	Setting data	Setting range	Setting side
(S1) + 0	Completion status	The status at the time of instruction completion is stored. 0: No error Other than 0: Error code (☞ Manual for the master module)	-	System
(S1) + 1	Station No.	Specify a station No. of a remote device station (MELSEC-ST system).	1 to 64	User
(S1) + 2	Send data size	Specify the size of data (S2) to (S2) + n. (Unit: Byte) Specify a value of (Cw Command execution area size [byte]) + 2 [byte]. For the Cw Command execution area size, refer to descriptions of each command. (☞ Section 8.2.1 Operating status read request (Command No.: 8100H/0100H) the following)  Specify the size of (S2) to (S2)+n.	1 to 255	User
(S1) + 3	Receivable data size	Specify the size of (D1) to (D1) + n. (Unit: Byte) Specify a value of (Cr Command result area size [byte]) + 2 [byte] or more. For the Cr Command result area size, refer to descriptions of each command. (☞ Section 8.2.1 Operating status read request (Command No.: 8100H/0100H) the following)  Specify the size of (D1) to (D1)+n.	0 to 255	User
(S1) + 4	Receive data size	The size of the data that are stored in Receive data (D1) is stored. (Unit: Byte) If a command is executed for the MELSEC-ST system, (Cr Command result area size [byte]) + 2 [byte] is stored.	0 to 255	System

(c) (S2), (D1)

The command to be sent to the MELSEC-ST system is stored in (S2).
The command result received from the MELSEC-ST system is stored in (D1).

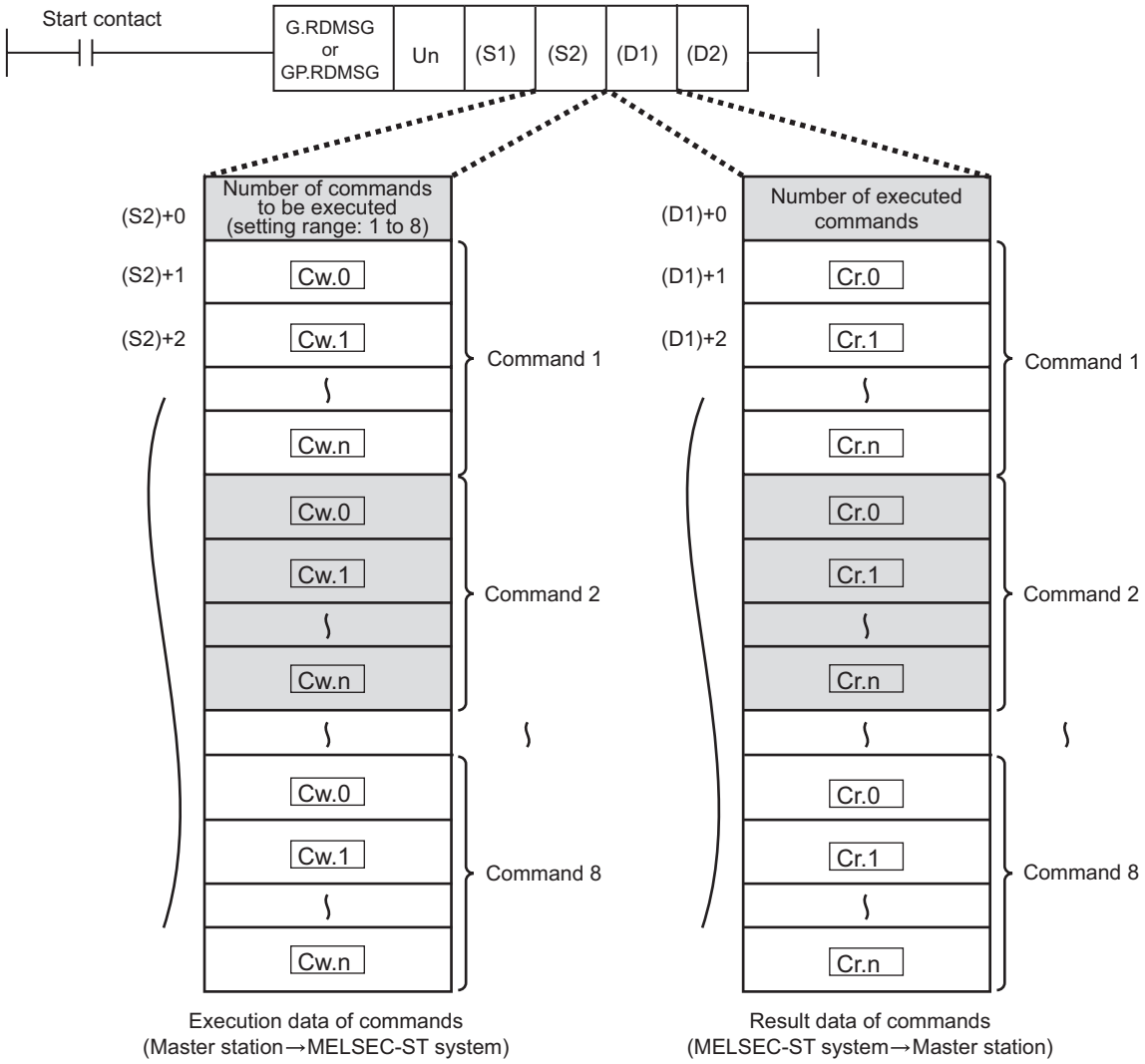


Figure 8.3 (S2), (D1)

Remark

For Cw Command execution area and Cr Command result area, refer to the following.

☞Section 8.2.1 Operating status read request (Command No.: 8100H/0100H) to Section 8.2.8 Initial data individual write request (Command No.: 8107H/0107H)

(d) (D2)

Specify a device which is to be turned ON for one scan upon completion of the dedicated instruction (RDMSG)
When the dedicated instruction (RDMSG) has failed, (D2)+1 also turns ON.

(3) Specifying the command execution target

Specify the command target head module or slice module in Cw Command execution area.

There are two methods for specifying the head module or each slice module.

- Slice position No.
  The number indicates where the slice module is located.
  The numbers are assigned to the modules in order, starting from 0 of the head module.
- Start slice No.
  The start slice No. is the start number of the slice No. that is assigned to each of the head module and slice modules.
  The start slice No. depends on the number of occupied slices.

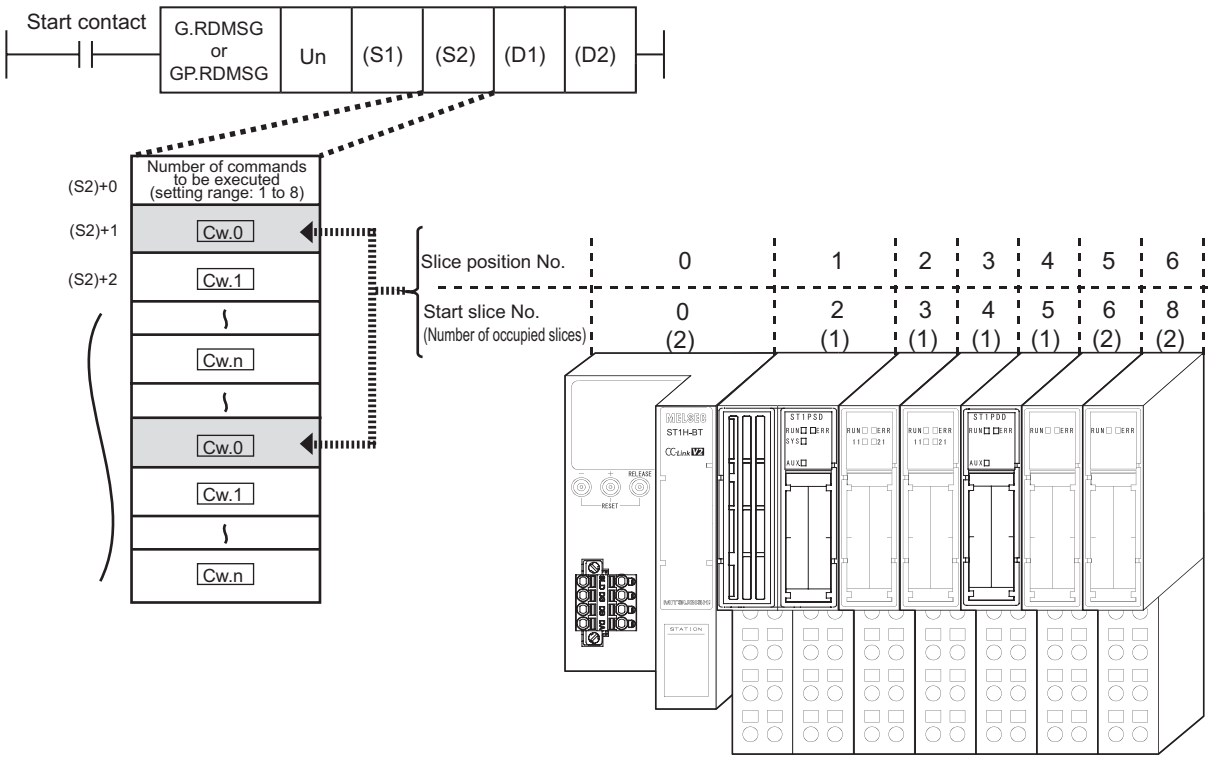


Figure 8.4 Difference between slice position No. and start slice No.

POINT

(1) If one command has two command numbers, use a command No.8000H or greater.
Commands, with the number 7FFFH and smaller, are used for importing existing sequence programs from the ST1H-PB (MELSEC-ST PROFIBUS-DP head module) to ST1H-BT (MELSEC-ST CC-Link head module).

(2) For commands with the number 8000H and greater, use slice position No. to specify the head module or each slice module.
For commands with the number 7FFFH and smaller, use start slice No. to specify the head module or each slice module.

(4) Procedures for using a command

The following explains how to use a command.

1) With the following signal(s) set to ON, set control data (S1) and send data (S2) and execute a dedicated instruction (RDMSG instruction).
   - Remote station READY (RXnB)*1
   - For command execution to an intelligent function module, Br.n Module READY of the intelligent function module

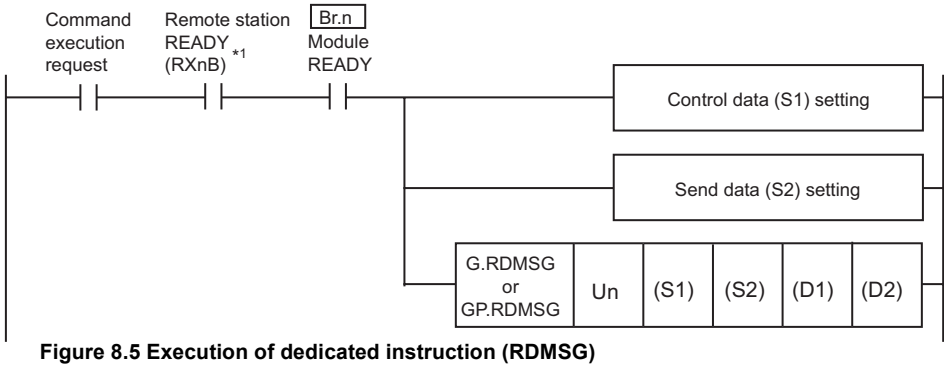


Figure 8.5 Execution of dedicated instruction (RDMSG)

* 1 Do not use Remote station READY (RXnB) together with the following commands (because it is set to OFF when an error occurs):
  - Operating status read request (Command No.: 8100H/0100H)
  - Error code read request (Command No.: 8101H/0101H)
  - Error history read request (Command No.: 8102H/0102H)
  - Error module information read request (Command No.: 0103H)
  - Error clear request (Command No.: 8104H/0104H)

2) Upon completion of the dedicated instruction (RDMSG), Completion device (D2) turns ON.

   When Completion device (D2) turns ON, Cr Command result area data stored in Receive data (D1) of the dedicated instruction (RDMSG) are read out. The command execution request is turned OFF when the reading is completed.

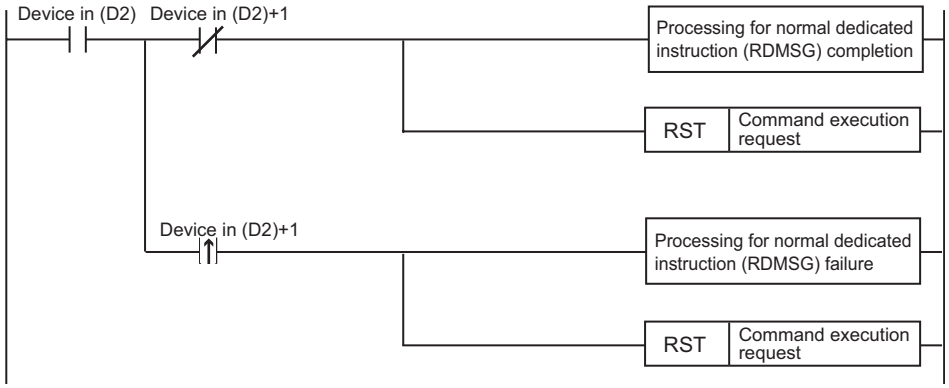


Figure 8.6 Reading Cr Command result area

Remark

For program examples, refer to the following.

☞Section 8.3 Command Program Example

The following illustrates the command operation.

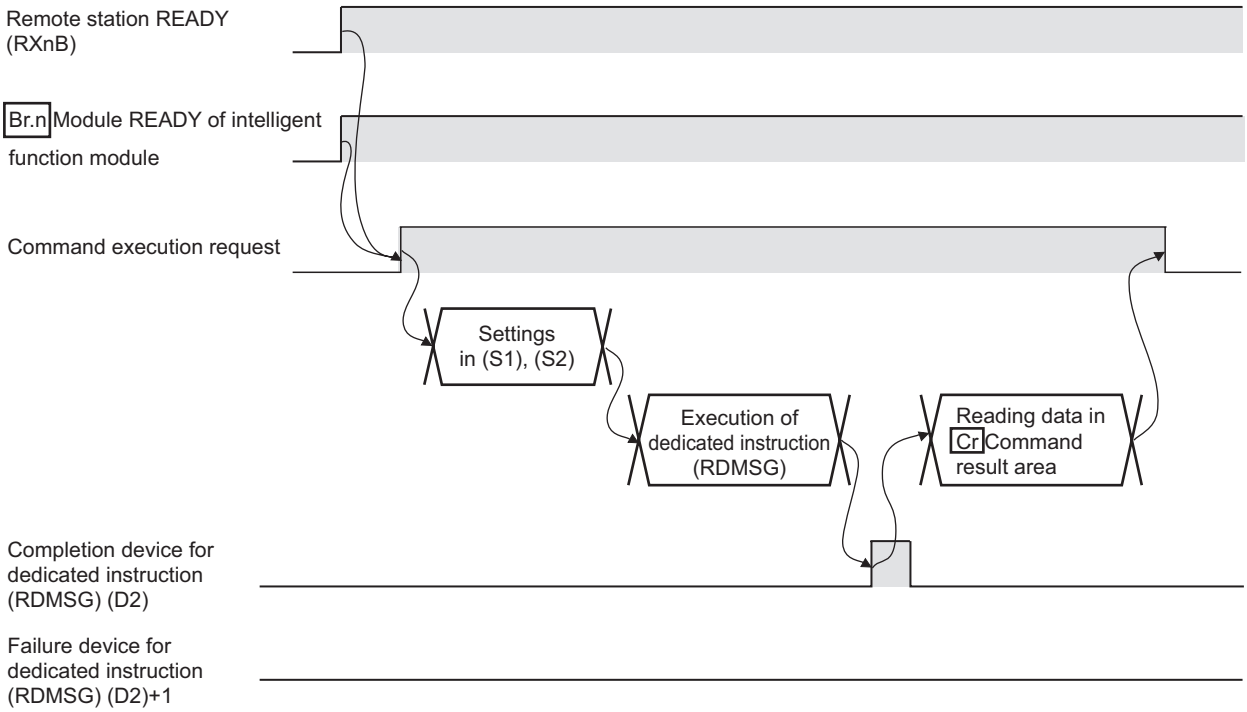

Remote station READY (RXnB)
Br.n Module READY of intelligent function module
Command execution request
Settings in (S1), (S2)
Execution of dedicated instruction (RDMSG)
Reading data in Cr Command result area
Completion device for dedicated instruction (RDMSG) (D2)
Failure device for dedicated instruction (RDMSG) (D2)+1

Figure 8.7 Procedures for using a command

(5) Precautions for command execution

(a) A command cannot be executed in the following cases.
Therefore, execute the command after completion of the following processing.
- While the head module is in self-diagnostic mode
- While the head module is in online module change mode, the REL. LED is on
- While another command is in execution, the dedicated instruction (RDMSG) has not been completed yet

(b) Up to eight commands can be simultaneously executed with one dedicated instruction (RDMSG).
However, the following commands cannot be simultaneously executed with another command.
- Initial data batch write request (command No.: 8106H)
- Initial data individual write request (command No.: 8107H/0107H)

If executed simultaneously, an error will occur.

(c) The sizes of Cw Command execution area and Cr Command result area differ depending on the command. (☞ Section 8.2 (1) Command list)

8.2 Commands

This section describes the commands for the head module, power distribution modules and I/O modules.

(1) Command list

(a) When one command has two command numbers
Use command No.8000H and greater.
Command, with the number 7FFFH and smaller, are used for importing existing sequence programs from the ST1H-PB (MELSEC-ST PROFIBUS-DP head module) to ST1H-BT (MELSEC-ST CC-Link head module).

(b) Command list
The following table lists the commands that can be sent from the master station.

Table 8.2 Command list

Command No.	Command name/ classification	Description	Target module	Reference section
8100H	Operating status read request	Reads the operating status of the head module and each slice module.	Head module, bus refreshing module, power feeding module, input module, output module, and intelligent function module	Section 8.2.1*1
0100H				
8101H	Error code read request	Reads an error code of the head module or each slice module.	Head module, bus refreshing module, power feeding module, input module, output module, and intelligent function module	Section 8.2.2*1
0101H				
8102H	Error history read request	Reads error history of the head module.	Head module	Section 8.2.3
0102H				
0103H	Error module information read request	Reads the start slice No. of the module where an error has occurred.	Head module	Section 8.2.4
8104H	Error clear request	Clears error information of the head module and each slice module.	Head module	Section 8.2.5
0104H				
8105H	Module mounting status read request	Reads the mounting status of a slice module.	Head module	Section 8.2.6
0105H				
8106H	Initial data batch write request	Batch-writes command parameters by module type.	Head module, input module, output module, and intelligent function module	Section 8.2.7*1
8107H	Initial data individual write request	Individually writes command parameters for each module.	Head module, input module, output module, and intelligent function module	Section 8.2.8*1
0107H				

Table 8.2 Command list(Continued)

Command No.	Command name/ classification	Description	Target module	Reference section
9000H to 9□□□H	Intelligent function module parameter read command	Reads each parameter set for the intelligent function module.	Intelligent function module	*1
1000H to 1□□□H				
A000H to A□□□H	Intelligent function module parameter write command	Writes each parameter to be set for the intelligent function module.	Intelligent function module	*1
2000H to 2□□□H				
B000H to B□□□H	Intelligent function module control command	Controls the intelligent function module.	Intelligent function module	*1
3000H to 3□□□H				

* 1 For commands for an intelligent function module, refer to the following manual.

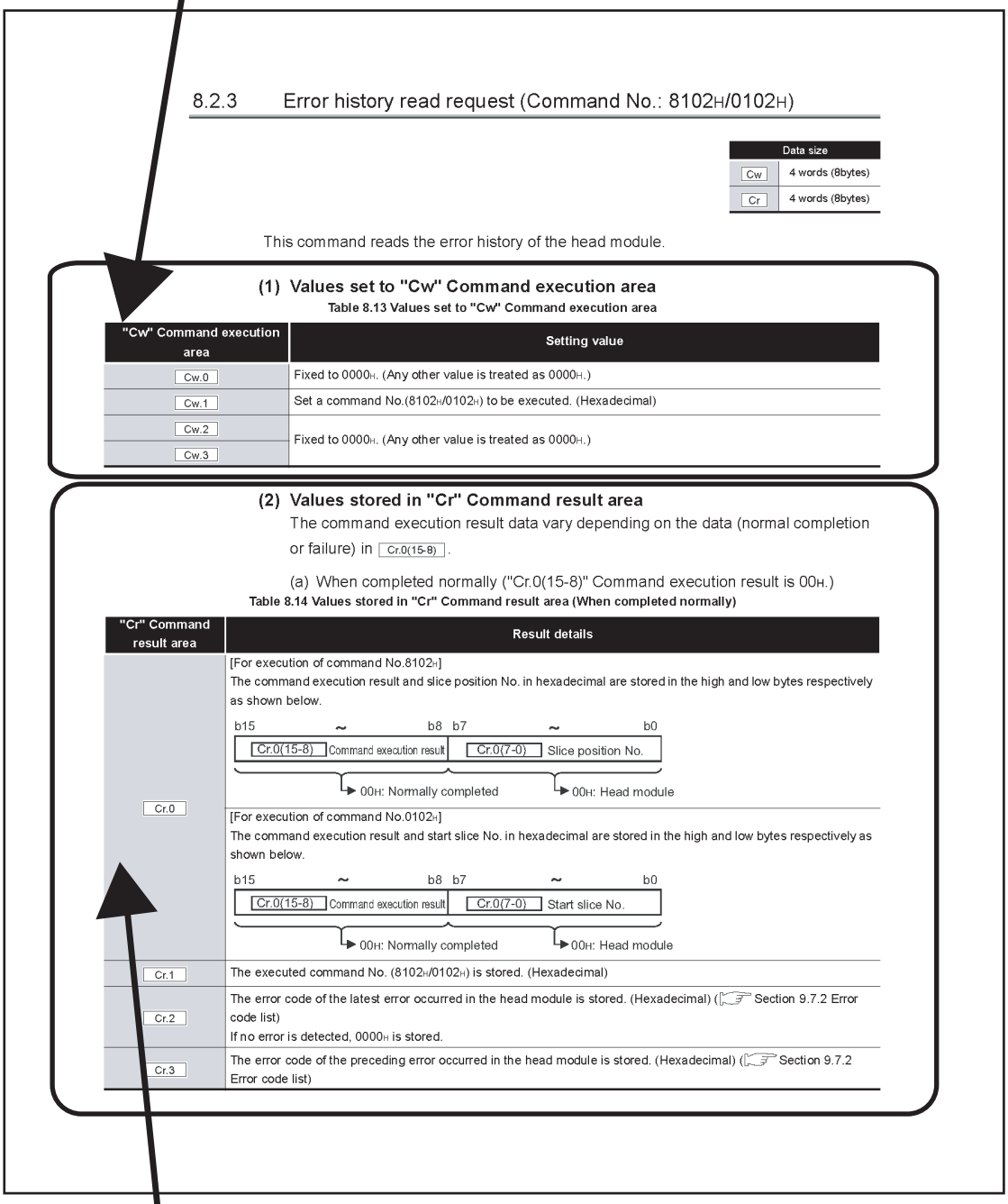
☞ Manual for the intelligent function module

(2) How to read this manual

How to read Section 8.2.1 to Section 8.2.8 in this manual is explained below.

(1) Values set to "Cw" Command execution area

Explains the values that are set to Cw Command execution area to execute the command.



8.2.3 Error history read request (Command No.: 8102H/0102H)

Data size	
Cw	4 words (8bytes)
Cr	4 words (8bytes)

This command reads the error history of the head module.

(1) Values set to "Cw" Command execution area

Table 8.13 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.1	Set a command No.(8102H/0102H) to be executed. (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0(15-8).

(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.14 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8102H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. b15 ~ b8 b7 ~ b0 Cr.0(15-8) Command execution result / Cr.0(7-0) Slice position No. 00H: Normally completed / 00H: Head module [For execution of command No.0102H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. b15 ~ b8 b7 ~ b0 Cr.0(15-8) Command execution result / Cr.0(7-0) Start slice No. 00H: Normally completed / 00H: Head module
Cr.1	The executed command No. (8102H/0102H) is stored. (Hexadecimal)
Cr.2	The error code of the latest error occurred in the head module is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list) If no error is detected, 0000H is stored.
Cr.3	The error code of the preceding error occurred in the head module is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list)

(2) Values stored in "Cr" Command result area

Explains the values that are stored in Cr Command result area after execution of the command.

8.2.1 Operating status read request (Command No.: 8100H/0100H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads the operating status of the head module, power distribution modules and I/O modules.

(1) Values set to "Cw" Command execution area

Write the same set values for the head module, power distribution modules, and I/O modules.

Table 8.3 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	[For execution of command No.8100H] Set the slice position No. of the target module. (Hexadecimal)
	[For execution of command No.0100H] Set the start slice No. of the target module. (Hexadecimal)
Cw.1	Set a command No. to be executed (8100H/0100H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

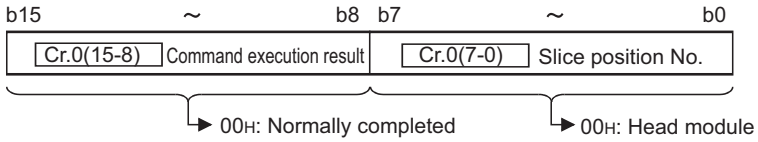
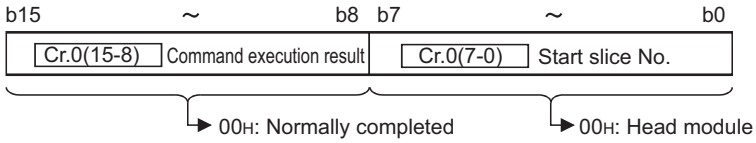
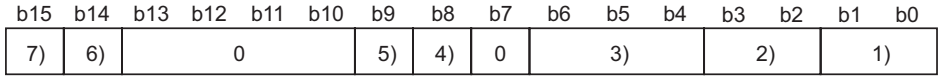
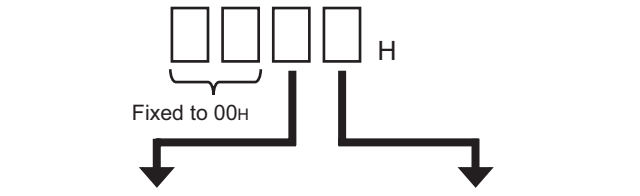
(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0(15-8).

(a) If the command was executed for the head module

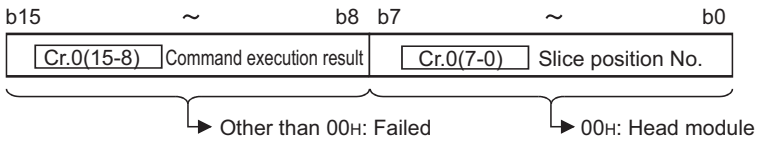
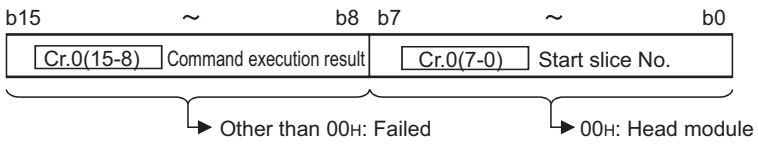
1) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.4 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8100H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0100H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8100H/0100H) is stored. (Hexadecimal)
Cr.2	The operating status of the head module is stored.  1) Extended cyclic setting 00: Single setting 01: Double setting 10: Quadruple setting 11: Octuple setting 2) Number of occupied stations 00: 1 station 01: 2 stations 10: 3 stations 11: 4 stations 3) Transmission speed 000: 156Kbps 001: 625Kbps 010: 2.5Mbps 011: 5Mbps 100: 10Mbps 111: No communication 4) Forced output test 0: Not executed 1: In execution 5) Online module change 0: Not executed 1: In execution 6) REL. LED status 0: OFF 1: ON 7) ERR. LED status 0: OFF 1: ON
Cr.3	Command parameter setting details of the head module are stored. 

2) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.5 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8100H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
	[For execution of command No.0100H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8100H/0100H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

(b) If the command was executed for a power distribution module or I/O module

1) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.6 Values stored in "Cr" Command result area (When completed normally)

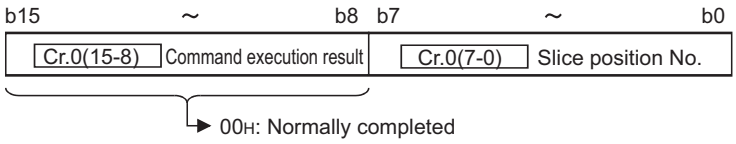
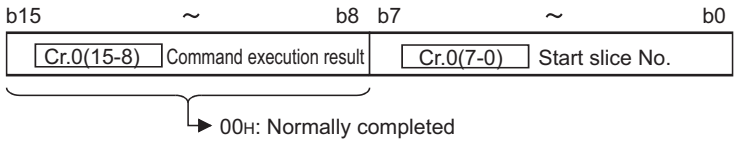
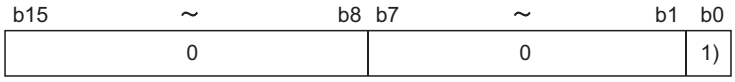
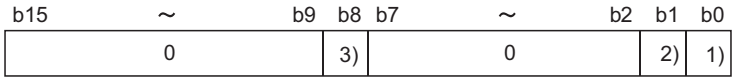
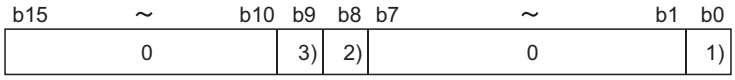
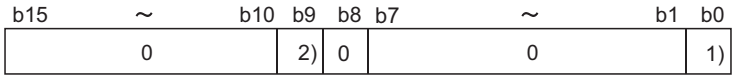
"Cr" Command result area	Result details
Cr.0	[For execution of command No.8100H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0100H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8100H/0100H) is stored. (Hexadecimal)
Cr.2	The operating status of the slice module, for which the command was executed, is stored. A minor or serious error is stored in the high or low byte respectively. <For input module>  1) 0: Normal 1: Hardware fault <For output module>  1) 0: Normal 1: Hardware fault 2) 0: Fuse not blown 1: Fuse blown 3) 0: Protective function inactive/not provided 1: Protective function active <For bus refreshing module>  1) 0: Normal 1: Hardware fault 2) 0: External system power normal 1: External system power low 3) 0: External auxiliary power normal 1: External auxiliary power low <For power feeding module>  1) 0: Normal 1: Hardware fault 2) 0: External auxiliary power normal 1: External auxiliary power low

Table 8.6 Values stored in "Cr" Command result area (When completed normally)(Continued)

"Cr" Command result area	Result details
Cr.3	The command parameter operating status of the slice module, for which the command was executed, is stored. <For input module> b15 ~ b1 b0 0 | 1) 1) Response time 0: 1.5ms (Default) 1: 0.5ms <For output module> b15 ~ b4 b3 b2 b1 b0 0 | 1) | 1 | 1 | 1 1) Clear/Hold setting 0: Clear (Default) 1: Hold <For bus refreshing module or power feeding module> b15 ~ b0 0

2) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.7 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8100H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. b15 ~ b8 b7 ~ b0 Cr.0(15-8) Command execution result | Cr.0(7-0) Slice position No. *1 Other than 00H: Failed (☞ Section 8.4 Values Stored into Command Execution Result)
	[For execution of command No.0100H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. b15 ~ b8 b7 ~ b0 Cr.0(15-8) Command execution result | Cr.0(7-0) Start slice No. *1 Other than 00H: Failed (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8100H/0100H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Slice position No. and start slice No.

8.2.2 Error code read request (Command No.: 8101H/0101H)

Data size	
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads error codes of the head module, power distribution modules and I/O modules.

(1) Values set to "Cw" Command execution area

Write the same set values for the head module, power distribution modules, and I/O modules.

Table 8.8 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	[For execution of command No.8101H] Set the slice position No. of the target module. (Hexadecimal)
	[For execution of command No.0101H] Set the start slice No. of the target module. (Hexadecimal)
Cw.1	Set a command No. (8101H/0101H) to be executed. (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

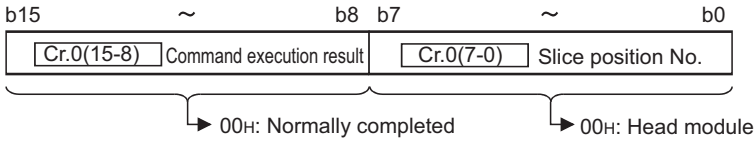
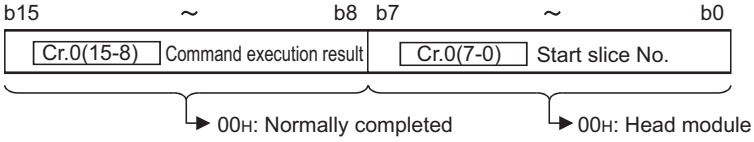
(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0(15-8).

(a) If the command was executed for the head module

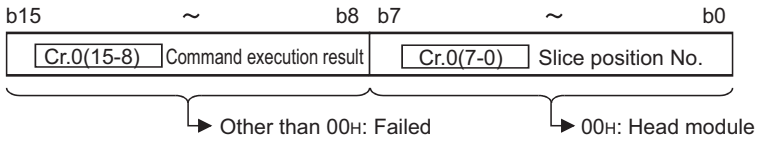
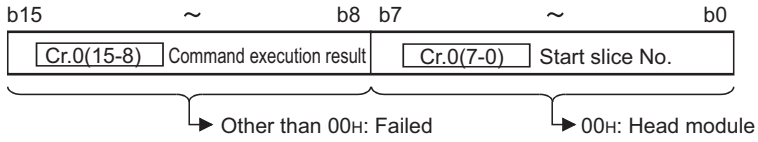
1) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.9 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8101H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0101H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8101H/0101H) is stored. (Hexadecimal)
Cr.2	The error code of the error that is currently occurring in the head module is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list) When no error is detected, 0000H is stored.
Cr.3	0000H is stored.

2) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

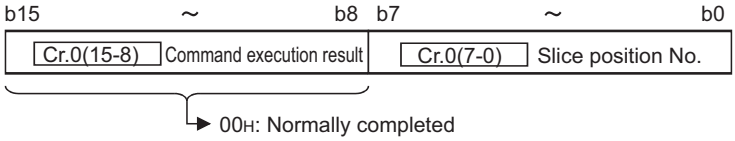
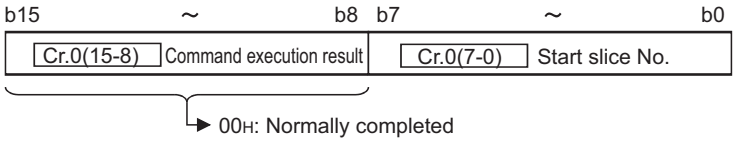
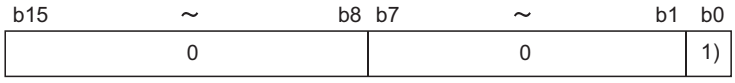
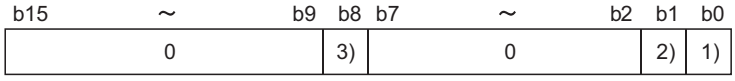
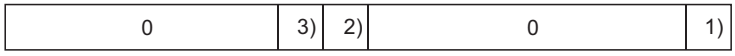
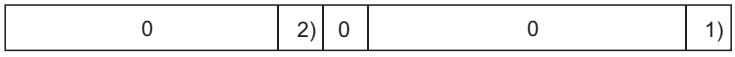
Table 8.10 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8101H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
	[For execution of command No.0101H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8101H/0101H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

(b) If the command was executed for a power distribution module or I/O module

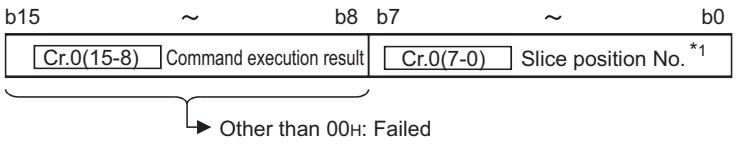
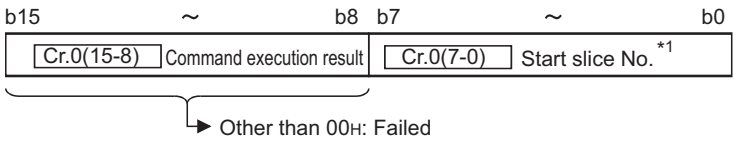
1) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.11 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8101H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0101H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8101H/0101H) is stored. (Hexadecimal)
Cr.2	The operating status of the slice module, for which the command was executed, is stored. A minor or serious error is stored in the high or low byte respectively. <For input module>  1) 0: Normal 1: Hardware fault <For output module>  1) 0: Normal 1: Hardware fault 2) 0: Fuse not blown 1: Fuse blown 3) 0: Protective function inactive/not provided 1: Protective function active <For bus refreshing module>  1) 0: Normal 1: Hardware fault 2) 0: External system power normal 1: External system power low 3) 0: External auxiliary power normal 1: External auxiliary power low <For power feeding module>  1) 0: Normal 1: Hardware fault 2) 0: External auxiliary power normal 1: External auxiliary power low
Cr.3	0000H is stored.

2) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.12 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8101H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
	[For execution of command No.0101H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8101H/0101H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Slice position No. or Start slice No.

8.2.3 Error history read request (Command No.: 8102H/0102H)

Data size	
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads the error history of the head module.

(1) Values set to "Cw" Command execution area

Table 8.13 Values set to "Cw" Command execution area

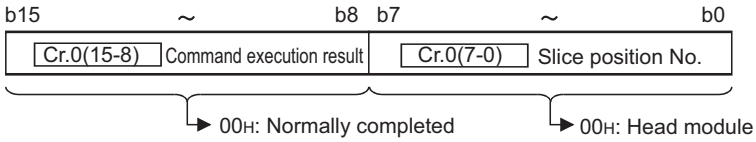
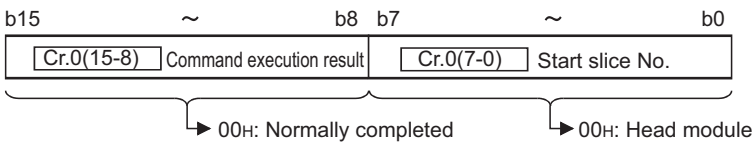
"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H. (slice position No. of the head module.)
Cw.1	Set a command No.(8102H/0102H) to be executed. (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0(15-8).

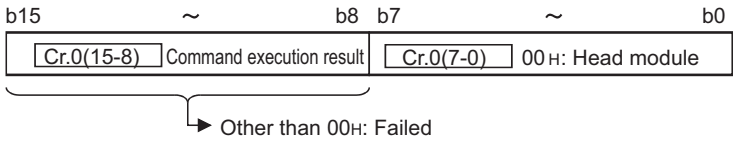
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.14 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8102H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0102H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8102H/0102H) is stored. (Hexadecimal)
Cr.2	The error code of the latest error occurred in the head module is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list) If no error is detected, 0000H is stored.
Cr.3	The error code of the preceding error occurred in the head module is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list)

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.15 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	The command execution result (hexadecimal) and 00H are stored in the high and low bytes respectively.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8102H/0102H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

8.2.4 Error module information read request (Command No.: 0103H)

Data size	
Cw	4 words (8 bytes)
Cr	18 words (36 bytes)

This command reads the slice position No. or start slice No. of the module where an error has occurred.

(1) Values set to "Cw" Command execution area

Table 8.16 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H. (start slice No. of the head module.)
Cw.1	Set the command No. (0103H) to be executed.
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0(15-8).

(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.17 Values stored in "Cr" Command result area (When completed normally)

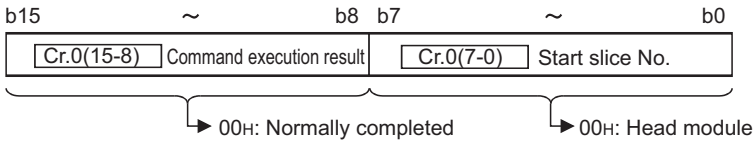
"Cr" Command result area	Result details
Cr.0	The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (0103H) is stored. (Hexadecimal)

Table 8.17 Values stored in "Cr" Command result area (When completed normally)(Continued)

"Cr" Command result area	Result details
Cr.2 to Cr.17	Information on the presence or absence of an error in the head module and slice modules is stored in Cr.2 to Cr.17 .*1

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
Cr.2	7		6		5		4		3		2		1		0		← Respective two bits indicate each start slice No.
Cr.3	15		14		13		12		11		10		9		8		
Cr.4	23		22		21		20		19		18		17		16		
Cr.5	31		30		29		28		27		26		25		24		
Cr.6	39		38		37		36		35		34		33		32		
Cr.7	47		46		45		44		43		42		41		40		
Cr.8	55		54		53		52		51		50		49		48		
Cr.9	63		62		61		60		59		58		57		56		
Cr.10	71		70		69		68		67		66		65		64		
Cr.11	79		78		77		76		75		74		73		72		
Cr.12	87		86		85		84		83		82		81		80		
Cr.13	95		94		93		92		91		90		89		88		
Cr.14	103		102		101		100		99		98		97		96		
Cr.15	111		110		109		108		107		106		105		104		
Cr.16	119		118		117		116		115		114		113		112		
Cr.17	127		126		125		124		123		122		121		120		

* 1 Indicates the error module information to be stored.

Table 8.18 For head module

Bit				Information	Error code
b3	b2	b1	b0		
0	0	0	0	Operating normally	-
0	0	0	1	Switch setting change error	F201H
1	0	1	1	Command parameter error	F203H
1	1	0	0	Slice module error	F200H
1	1	0	1	Parameter read error (Online module change)	C101H to C13FH
1	1	1	0	Replaced module error (Online module change)	C201H to C23FH

Table 8.19 For bus refreshing module

Bit		Item	Description
b(n+1)	bn		
0	0	Operating normally	The 24VDC voltages input from the SYS. input and AUX. input to the power distribution module are within the rated range.
0	1	External power supply 24VDC voltage low	(1) The 24VDC voltages input from the SYS. input and AUX. input to the power distribution module are low. (2) The 24VDC voltage input from the SYS. input to the power distribution module is low. (3) The 24VDC voltage input from the AUX. input to the power distribution module is low.

Table 8.20 For power feeding module

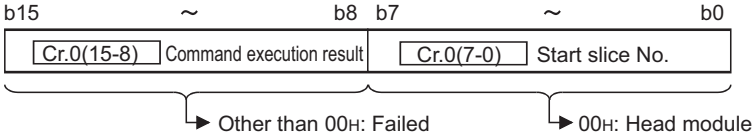
Bit		Item	Description
b(n+1)	bn		
0	0	Operating normally	The 24VDC voltage input from the AUX. input to the power distribution is within the rated range.
0	1	AUX. input 24VDC voltage low	The 24VDC voltage input from the AUX. input to the power distribution module is low.

Table 8.21 For intelligent function module

Bit		Item	Description
b(n+1)	bn		
0	0	Operating normally	-
0	1	Alarm or warning	(1) Indicates that an alarm or warning has occurred. (2) If an alarm or warning and a system error occur at the same time, the system error takes precedence and is written over the other. (3) The stored error information can be cleared by Error clear request (command No.: 8104H/0104H) or Error reset request (RYnA). (4) The alarm information is automatically cleared when the cause of the alarm is removed. (Except for warnings of ST1DA□) (5) For the ST1DA1-I/ST1DA1-I-F01, this is fixed to "00". (For a watchdog timer error, "11" is stored.)
1	0		
1	1	System error	Indicates that a system error has occurred.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.22 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (0103H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

8.2.5 Error clear request (Command No.: 8104H/0104H)

	Data size
Cw	Command No.8104H: 6 words (12 bytes) Command No.0104H: 18 words (36 bytes)
Cr	4 words (8 bytes)

This command clears error information of the head module and each slice module.

(1) Values set to "Cw" Command execution area

Table 8.23 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H. (slice position No. of the head module.)
Cw.1	Set a command No. (8104H/0104H) to be executed. (Hexadecimal)
Cw.2 to Cw.n	[For execution of command No.8104H] Set data for a slice position No. of the head module or slice module whose error is to be cleared. (Each bit indicates each slice position No.) 0: Error clear not requested 1: Error clear requested [For execution of command No.0104H] Set data for a start slice No. of the head module or slice module whose error is to be cleared. (Respective two bits indicate each start slice No.) 00: Error clear not requested 01: Error clear requested

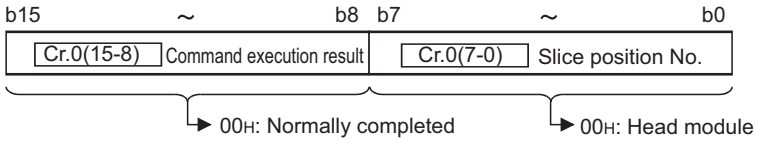
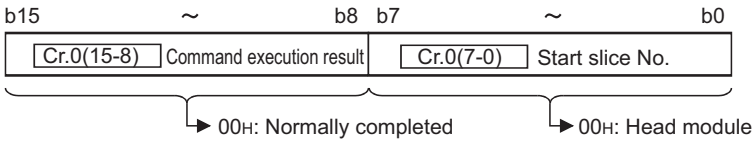
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Cw.2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Cw.3	31	30	29	28	28	26	25	24	23	22	21	20	19	18	17	16
Cw.4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Cw.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Cw.2	7	6	5	4	3	2	1	0								
Cw.3	15	14	13	12	11	10	9	8								
Cw.4	23	22	21	20	19	18	17	16								
Cw.5	31	30	29	28	27	26	25	24								
Cw.6	39	38	37	36	35	34	33	32								
Cw.7	47	46	45	44	43	42	41	40								
Cw.8	55	54	53	52	51	50	49	48								
Cw.9	63	62	61	60	59	58	57	56								
Cw.10	71	70	69	68	67	66	65	64								
Cw.11	79	78	77	76	75	74	73	72								
Cw.12	87	86	85	84	83	82	81	80								
Cw.13	95	94	93	92	91	90	89	88								
Cw.14	103	102	101	100	99	98	97	96								
Cw.15	111	110	109	108	107	106	105	104								
Cw.16	119	118	117	116	115	114	113	112								
Cw.17	127	126	125	124	123	122	121	120								

(2) Values stored in "Cr" Command result area

The command result area is as shown below.

Table 8.24 Values stored in "Cr" Command result area

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8104H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0104H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8104H/0104H) is stored. (Hexadecimal)
Cr.2	0000H is stored.
Cr.3	

POINT

Failure of this command is not shown as result values.
Check whether the error was cleared normally or not by the following.

- Check if Error status (RXnA) is OFF.
  The OFF status indicates the error was cleared.
- If Error status (RXnA) is ON, identify a faulty module with Error module information read request (command No.: 0103H).

For error checking and error clearing method, refer to the following.

☞ Section 7.3 (2) Program examples

8.2.6 Module mounting status read request (Command No.: 8105H/0105H)

	Data size
Cw	4 words (8 bytes)
Cr	Command No.8105H: 6 words (12 bytes) Command No.0105H: 10 words (20 bytes)

This command reads the mounting status of each slice module.

(1) Values set to "Cw" Command execution area

Table 8.25 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H. (slice position No. of the head module.)
Cw.1	Set a command No. (8105H/0105H) to be executed. (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0(15-8).

(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.26 Values stored in "Cr" Command result area (When completed normally)

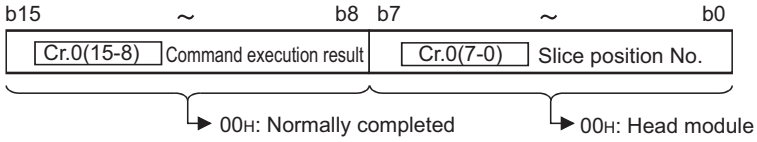
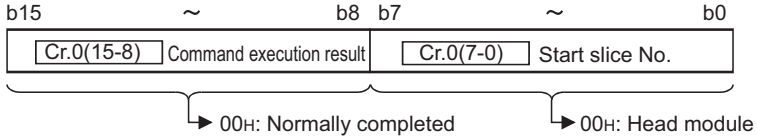
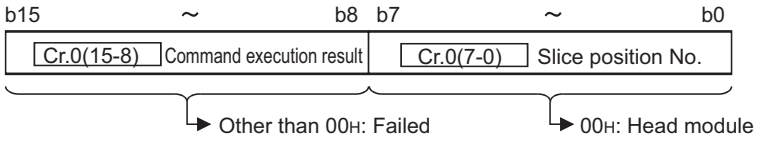
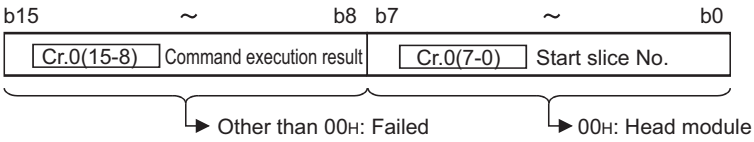
"Cr" Command result area	Result details
Cr.0	[For execution of command No.8105H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0105H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8105H/0105H) is stored. (Hexadecimal)

Table 8.26 Values stored in "Cr" Command result area (When completed normally)(Continued)

"Cr" Command result area	Result details
Cr.2 to Cr.n	[For execution of command No.8105H] The mounting status data of each slice module is stored. b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 Cr.2: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ← Each bit indicates each slice position No. Cr.3: 31 30 29 28 28 26 25 24 23 22 21 20 19 18 17 16 Cr.4: 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 Cr.5: 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 0: Not mounted, or module failure 1: Mounted [For execution of command No.0105H] The mounting status data of each slice module is stored. b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 Cr.2: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 ← Each bit indicates each slice position No. Cr.3: 31 30 29 28 28 26 25 24 23 22 21 20 19 18 17 16 Cr.4: 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 Cr.5: 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 Cr.6: 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 Cr.7: 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 Cr.8: 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 96 Cr.9: Fixed to 0 125 124 123 122 121 120 119 118 117 116 115 114 113 112 0: Not mounted, or module failure 1: Mounted

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.27 Valued stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	[For execution of command No.8105H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
	[For execution of command No.0105H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8105H/0105H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

8.2.7 Initial data batch write request (Command No.: 8106H)

	Data size
Cw	6 to 20 words (12 to 40 bytes)
Cr	6 words (12 bytes)

This command batch-writes command parameters to the following modules by module type.

- Head module
- Input module
- Output module
- Intelligent function module (batch-write to each module model)

(1) Values set to "Cw" Command execution area

Table 8.28 Values set to "Cw" Command execution area

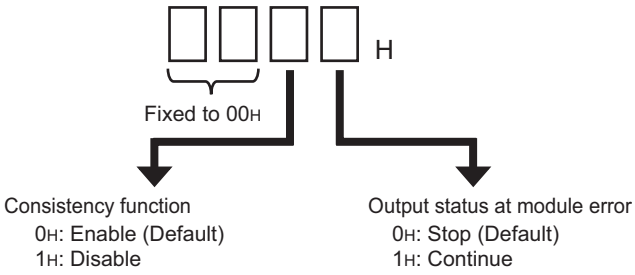
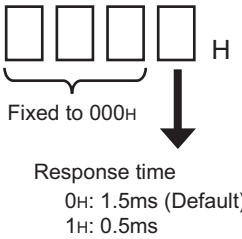
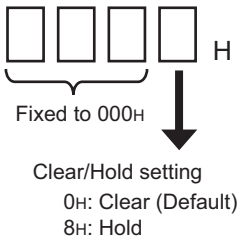
"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H.
Cw.1	Set the command No. (8106H) to be executed. (Hexadecimal)
Cw.2	Set command parameters for the head module. (Cannot be omitted.) 
Cw.3	Set a command parameter for input modules. (Cannot be omitted.) If no input module is mounted, this setting is ignored. (No error is detected.) 
Cw.4	Set a command parameter for output modules. (Cannot be omitted.) If no output module is mounted, this setting is ignored. (No error is detected.) 

Table 8.28 Values set to "Cw" Command execution area(Continued)

"Cw" Command execution area	Setting value
Cw.5	Set the number of command parameter settings for intelligent function modules in Cw.6 to Cw.19 (number of module types: 0 to 7).
Cw.6 to Cw.19	Set command parameters for intelligent function modules. For details, refer to the following manual. ☞ Manual for the intelligent function module

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0.

(a) When completed normally ("Cr.0" is 0000H.)

Table 8.29 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	An error code (0000H when completed normally) is stored.
Cr.1	The executed command No. (8106H) is stored. (Hexadecimal)
Cr.2 Cr.3 Cr.4 Cr.5	The command parameter setting status after writing is stored for each slice module. b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 Cr.2: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Cr.3: 31 30 29 28 28 26 25 24 23 22 21 20 19 18 17 16 Cr.4: 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 Cr.5: 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 ← Each bit indicates each slice position No. 0: Parameter not set 1: Parameter set

(b) When failed ("Cr.0" is other than 0000H.)

Table 8.30 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	An error code is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list)
Cr.1	The executed command No. (8106H) is stored. (Hexadecimal)
Cr.2 Cr.3 Cr.4 Cr.5	The command parameter setting status after writing is stored for each slice module. b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 Cr.2: 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Cr.3: 31 30 29 28 28 26 25 24 23 22 21 20 19 18 17 16 Cr.4: 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 Cr.5: 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 ← Each bit indicates each slice position No. 0: Parameter not set 1: Parameter set

POINT

(1) In Cw.6 to Cw.19, intelligent function module's command parameter settings exceeding the quantity set in Cw.5 are not executed.

(2) Initial data batch write request (command No.: 8106H) cannot be executed with another command at the same time.
Doing so will cause an error.

8.2.8 Initial data individual write request (Command No.: 8107H/0107H)

	Data size
Cw	6 to 99 words (12 to 198 bytes)
Cr	4 to 35 words (8 to 70 bytes)

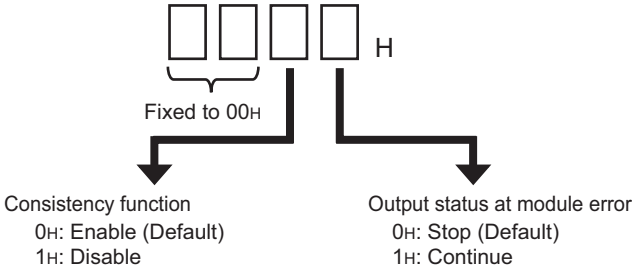
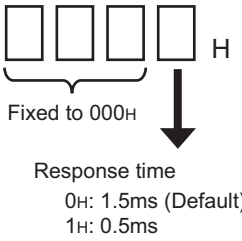
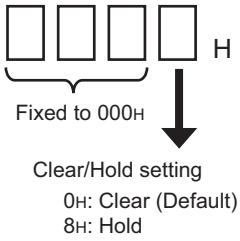
This command writes command parameters for each module.

(1) Values set to "Cw" Command execution area

Table 8.31 Values set to "Cw" Command execution area

"Cw" Command execution area	Setting value
Cw.0	Fixed to 0000H.
Cw.1	Set a command No. (8107H/0107H) to be executed. (Hexadecimal)
Cw.2	Set the number of command parameter settings (1 to 32).
Cw.3	[For execution of command No.8107H] Set the slice position No. of the target module. (Hexadecimal)
	[For execution of command No.0107H] Set the start slice No. of the target module. (Hexadecimal)
Cw.4	Set the type of the target module. □□□□H Head module : 0000H Input module : 0080H Output module : 0040H Intelligent function module : ☞ Manual for the intelligent function module

Table 8.31 Values set to "Cw" Command execution area(Continued)

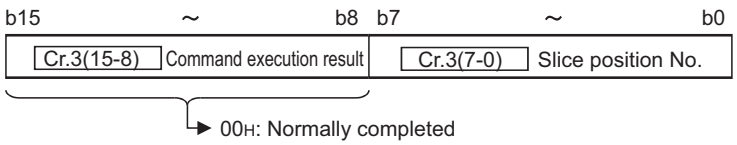
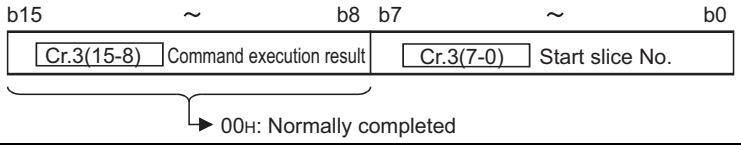
"Cw" Command execution area	Setting value
Cw.5	Set command parameters. (For the head module)  (For input modules)  (For output modules)  (For intelligent function modules) For details, refer to the following manual. ☞ Manual for the intelligent function module
Cw.6 to Cw.98	Set command parameters in the same way as in Cw.3 to Cw.5. (Three words for each)

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0.

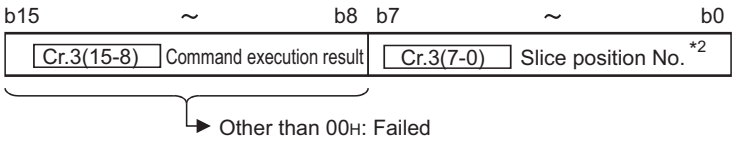
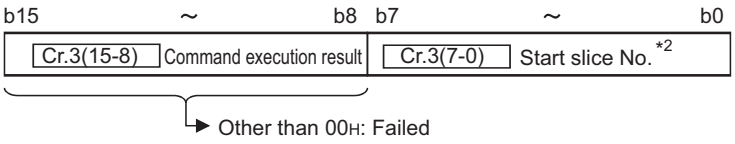
(a) When completed normally ("Cr.0" is 0000H.)

Table 8.32 Values stored in "Cr" Command result area (When completed normally)

"Cr" Command result area	Result details
Cr.0	An error code (0000H when completed normally) is stored.
Cr.1	The executed command No. (8107H/0107H) is stored. (Hexadecimal)
Cr.2	The number of command parameter settings (1 to 32) is stored.
Cr.3	[For execution of command No.8107H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  [For execution of command No.0107H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.4 to Cr.34	The execution results for the settings are stored in the same way as in Cr.3.

(b) When failed ("Cr.0" is other than 0000H.)

Table 8.33 Values stored in "Cr" Command result area (When failed)

"Cr" Command result area	Result details
Cr.0	An error code is stored. (Hexadecimal) (☞ Section 9.7.2 Error code list)*1
Cr.1	The executed command No. (8107H/0107H) is stored. (Hexadecimal)
Cr.2	The number of command parameter settings (1 to 32) is stored.
Cr.3	[For execution of command No.8107H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result) [For execution of command No.0107H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ Section 8.4 Values Stored into Command Execution Result)
Cr.4 to Cr.34	The execution results for the settings are stored in the same way as in Cr.3.

* 1 When error code, F206H is generated, 0 is stored in Cr.2 and no response is stored to each request.

* 2 When 0FH is stored in Cr.3(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.3(7-0) Slice position No. or Start slice No.

POINT

(1) In Cw.3 to Cw.98, intelligent function module's command parameter settings exceeding the quantity set in Cw.2 are not executed.

(2) Initial data individual write request (command No.: 8107H/0107H) cannot be executed with another command at the same time.
Doing so will cause an error.

(3) When the slice position No. or start slice No. is duplicated, the module with the duplicate setting is detected as an error module.

8.3 Command Program Example

This section shows a command program example.
The program is created based on the system configuration in Section 7.1, and Operating status read request (command No.: 8100H) is executed for the head module (slice position No.0) in the program example.
Note that it is assumed that the settings described in Section 7.1 and Section 7.2 have been completed and cyclic transmission has been started.

(1) Device assignments in the program example

For the program example in this section, the following device assignments are used.

(a) Devices used by the user

1) Start request

Table 8.34 Start request

Device	Application	Device	Application
M100	Operating status read signal	D150 to D154	Control data
M200	Completion device	D1500 to D1504	Send data (execution data of the command)
M201	Completion status indicator device	D2500 to D2504	Receive data (result data of the command)

(b) Devices used for I/O data

Devices used for I/O data are the same as the following devices.

☞Section 7.3 (1) Device assignments in program examples

(2) Program example

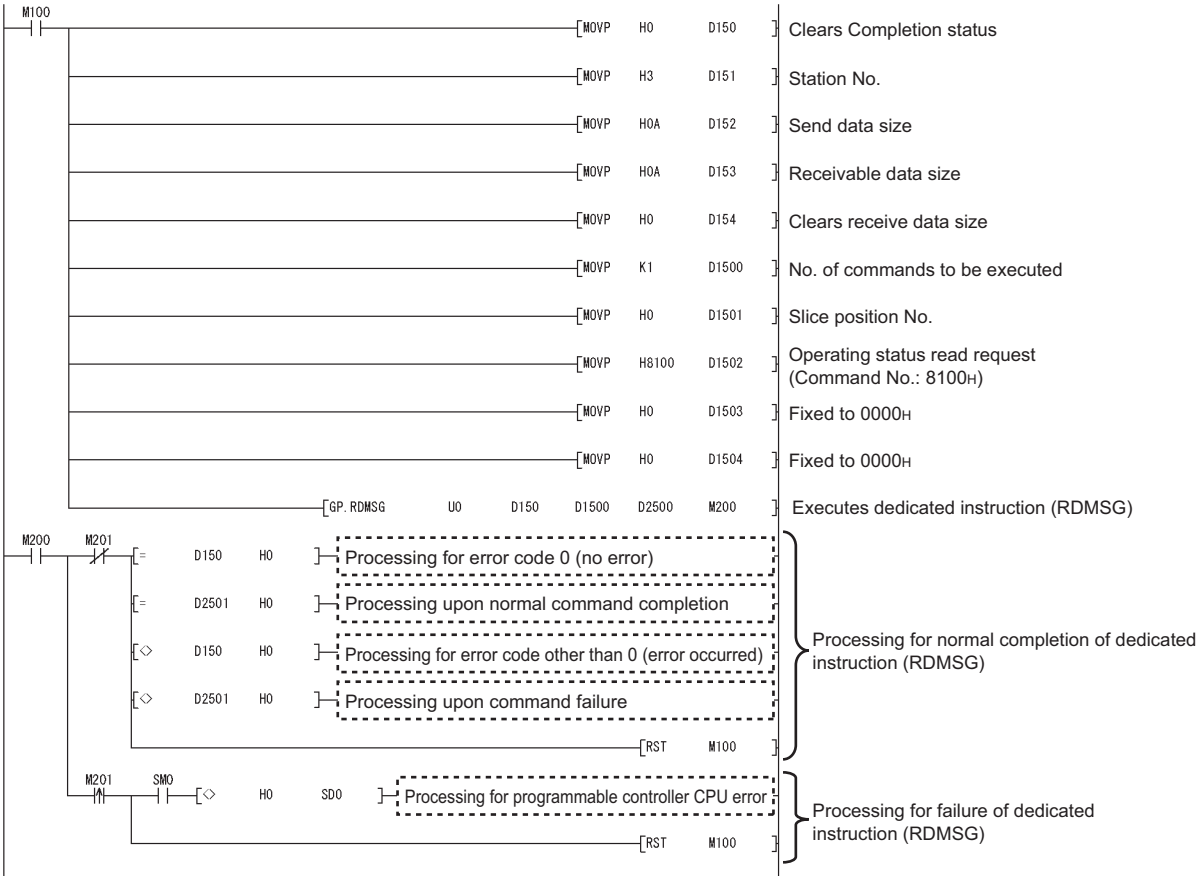


Figure 8.8 Program example

8.4 Values Stored into Command Execution Result

The following table lists the values that can be stored into Cr.n(15-8) Command execution result in Cr Command result area.

Table 8.35 Values stored in Command execution result

Command execution result	Description	Action
00H	Normally terminated.	-
01H	The requested command No. is not available for the specified module.	Check whether the requested command No. is available for the module specified in Cw.0 Slice position No. or Start slice No.
02H	Values in the area starting from Cw.2 are out of range.	Check whether the values set in the area starting from Cw.2 in Cw Command execution area are within the range available for the requested command No. or not.
03H	The specified Cw.0 Slice position No. or Start slice No. is incorrect.	Check whether the module is mounted in the position corresponding to Cw.0 Slice position No. or Start slice No. Check the Cw.0 Slice position No. or Start slice No. is the slice position No. or start slice No. of the module.
04H	There is no response from the specified module.	Check whether the intelligent function module specified by Cw.0 Slice position No. or Start slice No. can use the requested command No. If the requested command No. is available, the intelligent function module may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
05H	No communication is available with the specified module.	The slice module may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
06H	The requested command is not executable in the current operating status (operation mode) of the module.	Check the operating status of the head module and intelligent function module, and change it so that the requested command can be executed.
07H	The specified module has already been in the specified mode.	The intelligent function module specified by Cw.0 Slice position No. or Start slice No. is already in the requested mode. Continue the specified operation mode.
08H	The specified module cannot be changed into the specified mode.	Check the operation mode of the intelligent function module specified by Cw.0 Slice position No. or Start slice No. and set it in the condition where the current mode can be changed to the requested mode.
09H	The specified module is in the online module change status.	Execute the command after online module change is completed.
0AH	The specified module number is different from the actual one, or it does not exist.	Check whether the module number specified in Cw Command execution area is the actual module number.

Table 8.35 Values stored in Command execution result(Continued)

Command execution result	Description	Action
0F$_H$	The value of slice position No. or start slice No. is out of range.	Check whether the value set for Slice position No. or Start slice No. is within the following range. •Slice position No.: 0$_H$ to 3F$_H$ •Start slice No.: 0$_H$ to 7F$_H$
10$_H$	Parameters cannot be read from the specified module.	Execute the command again. If the problem still persists, the intelligent function module may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
11$_H$	Parameters cannot be written to the specified module.	
13$_H$	The specified module is not ready for parameter writing.	Check the conditions for parameter writing.

CHAPTER9 TROUBLESHOOTING

This chapter explains how to troubleshoot problems of the head module and its error codes.

9.1 Before Troubleshooting

Check the conditions described in this section before troubleshooting the head module.

(1) Is the MELSEC-ST system configuration correct?

Table 9.1 Checking the MELSEC-ST system configuration

Item	Description
Does the number of slice modules exceed the limit?	Check if 63 or less slice modules are installed to the head module. Also, if intelligent function modules are mounted, check that the number of the intelligent function modules is 26 or less. If these limits are exceeded, the RUN LED of the out-of-range slice module is off.
Is the total of the occupied I/O points for each module 252 points or less?	Check if the total occupied I/O points for the modules in the MELSEC-ST system are 252 points or less. (The number of available points reduces by 2 points for each additional power distribution module.) If the above limit is exceeded, the RUN LED of the out-of-range slice module is off. (☞ Section 5.2.1 Checking the MELSEC-ST system)
Are slice modules mounted on the base modules?	Check that slice modules have been mounted to all base modules before turning on the external power supply for the MELSEC-ST system.
Are the combinations of the slice modules and base modules correct?	Check if each slice module is mounted to an appropriate base module. (☞ Manual for each slice module)
Is the total slot width of the slice modules 85cm or less?	Check if the total slot width of the slice modules (excluding the head module) in the MELSEC-ST system is 85cm or less. (☞ "External Dimensions" in the manual for each slice module)
Does the total 5V DC internal current consumption and the total 24V DC current exceed the capacity of the power distribution modules?	Calculate the total value of 5V DC internal current consumption and 24V DC current, and check if it exceeds the capacity of the power distribution modules or not. (☞ MELSEC-ST System User's Manual, "Section 5.2.1 Current consumption calculation")

(2) Has an error occurred in the programmable controller CPU on the master station?

If a stop error has occurred in the programmable controller CPU, identify the error code and take corrective actions. (☞ QCPU User's Manual (Hardware Design, Maintenance and Inspection)

9.2 Troubleshooting Procedures

This section describes troubleshooting procedures.
If a problem arises, check the conditions of the master station and MELSEC-ST system, and resolve the problem according to the following.

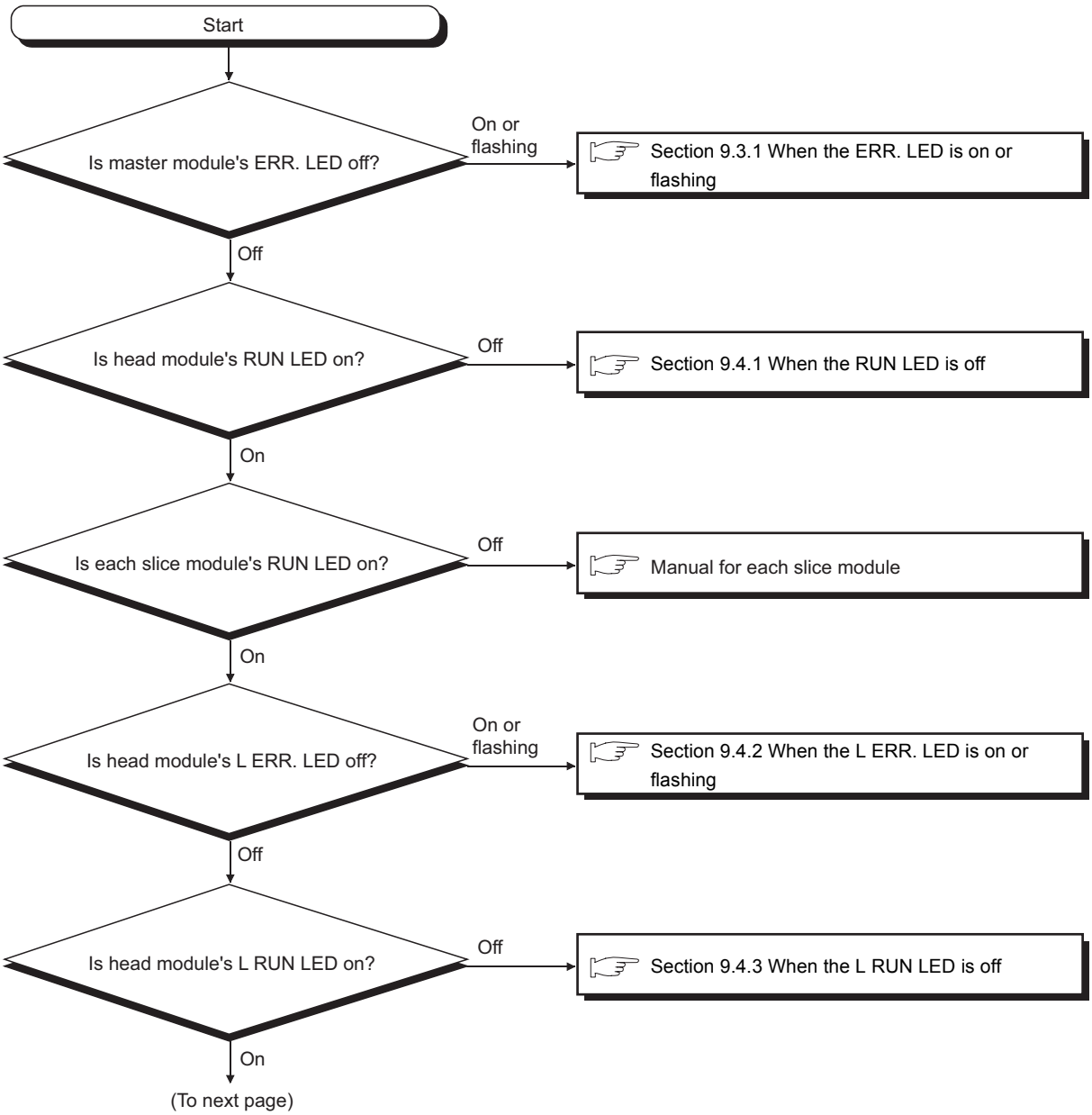

Start
Is master module's ERR. LED off?
On or flashing
Section 9.3.1 When the ERR. LED is on or flashing
Off
Is head module's RUN LED on?
Off
Section 9.4.1 When the RUN LED is off
On
Is each slice module's RUN LED on?
Off
Manual for each slice module
On
Is head module's L ERR. LED off?
On or flashing
Section 9.4.2 When the L ERR. LED is on or flashing
Off
Is head module's L RUN LED on?
Off
Section 9.4.3 When the L RUN LED is off
On
(To next page)

Figure 9.1 Troubleshooting procedures

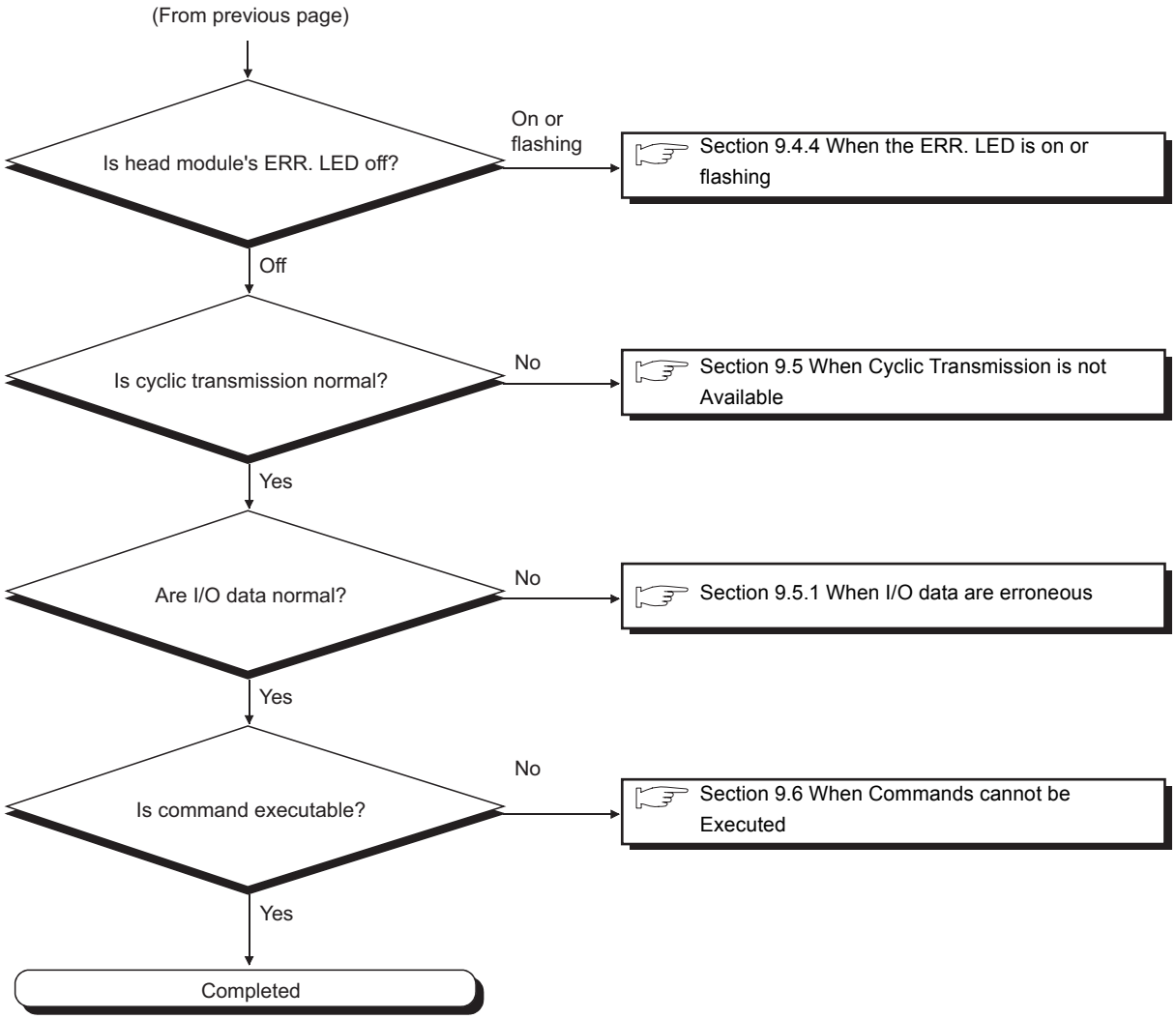


Figure 9.1 Troubleshooting procedures (continued)

9.3 Troubleshooting on the Master Module

This section describes troubleshooting on the master module.

9.3.1 When the ERR. LED is on or flashing

When the ERR. LED of the master module is on or flashing, troubleshoot the problem according to the following.

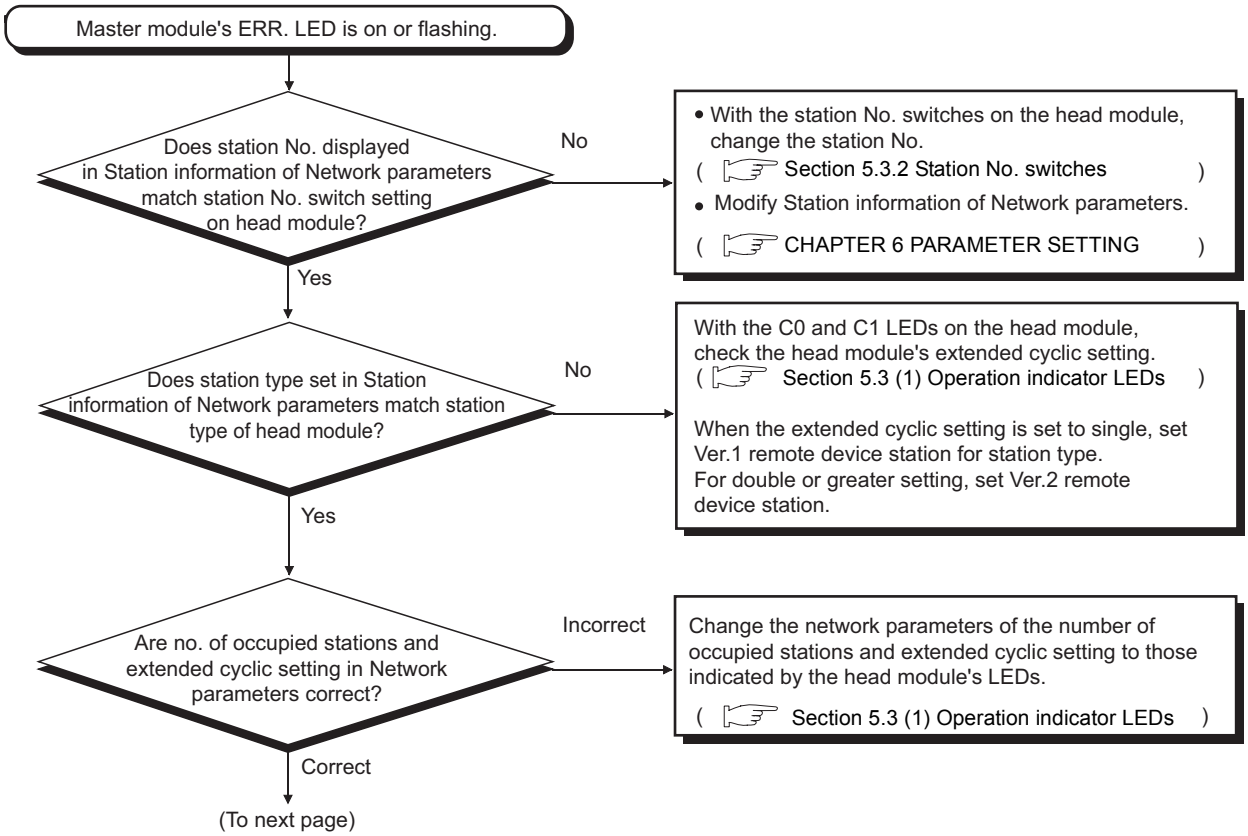

Master module's ERR. LED is on or flashing.
Does station No. displayed in Station information of Network parameters match station No. switch setting on head module?
No
• With the station No. switches on the head module, change the station No.
(Section 5.3.2 Station No. switches)
• Modify Station information of Network parameters.
(CHAPTER 6 PARAMETER SETTING)
Yes
Does station type set in Station information of Network parameters match station type of head module?
No
With the C0 and C1 LEDs on the head module, check the head module's extended cyclic setting.
(Section 5.3 (1) Operation indicator LEDs)
When the extended cyclic setting is set to single, set Ver.1 remote device station for station type.
For double or greater setting, set Ver.2 remote device station.
Yes
Are no. of occupied stations and extended cyclic setting in Network parameters correct?
Incorrect
Change the network parameters of the number of occupied stations and extended cyclic setting to those indicated by the head module's LEDs.
(Section 5.3 (1) Operation indicator LEDs)
Correct
(To next page)

Figure 9.2 When the ERR. LED is on or flashing

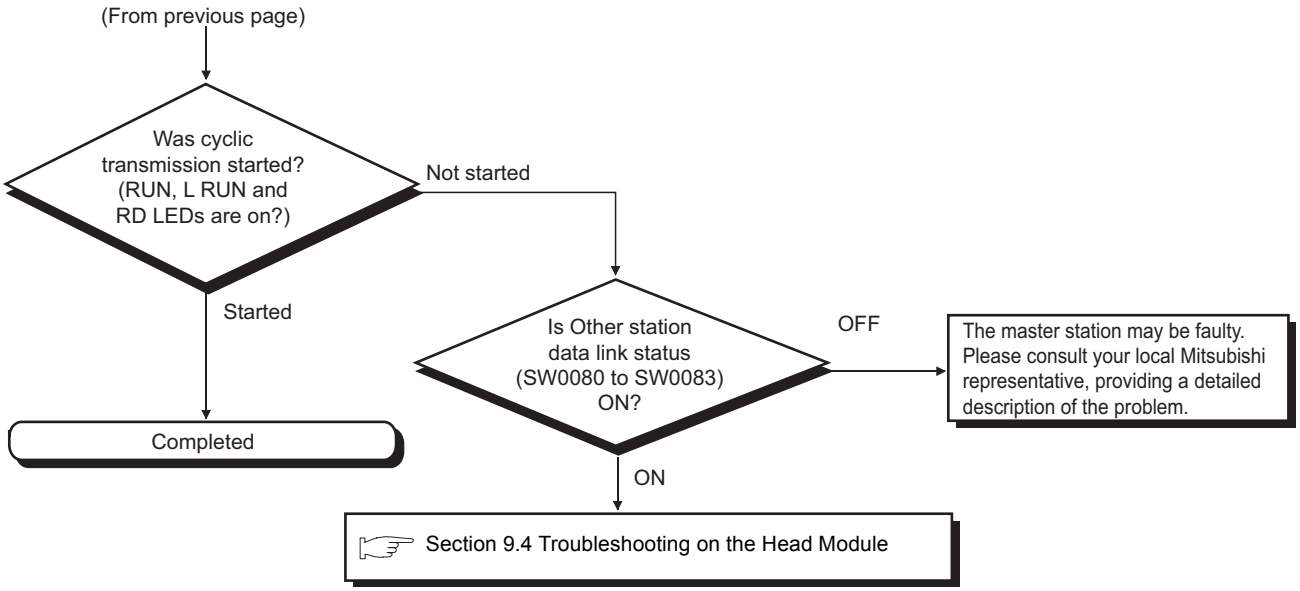

(From previous page)
Was cyclic transmission started? (RUN, L RUN and RD LEDs are on?)
Not started
Started
Completed
Is Other station data link status (SW0080 to SW0083) ON?
OFF
The master station may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
ON
Section 9.4 Troubleshooting on the Head Module

Figure 9.2 When the ERR. LED is on or flashing (continued)

9.4 Troubleshooting on the Head Module

This section describes troubleshooting on the head module.

9.4.1 When the RUN LED is off

When the RUN LED of the head module is off, troubleshoot the problem according to the following.

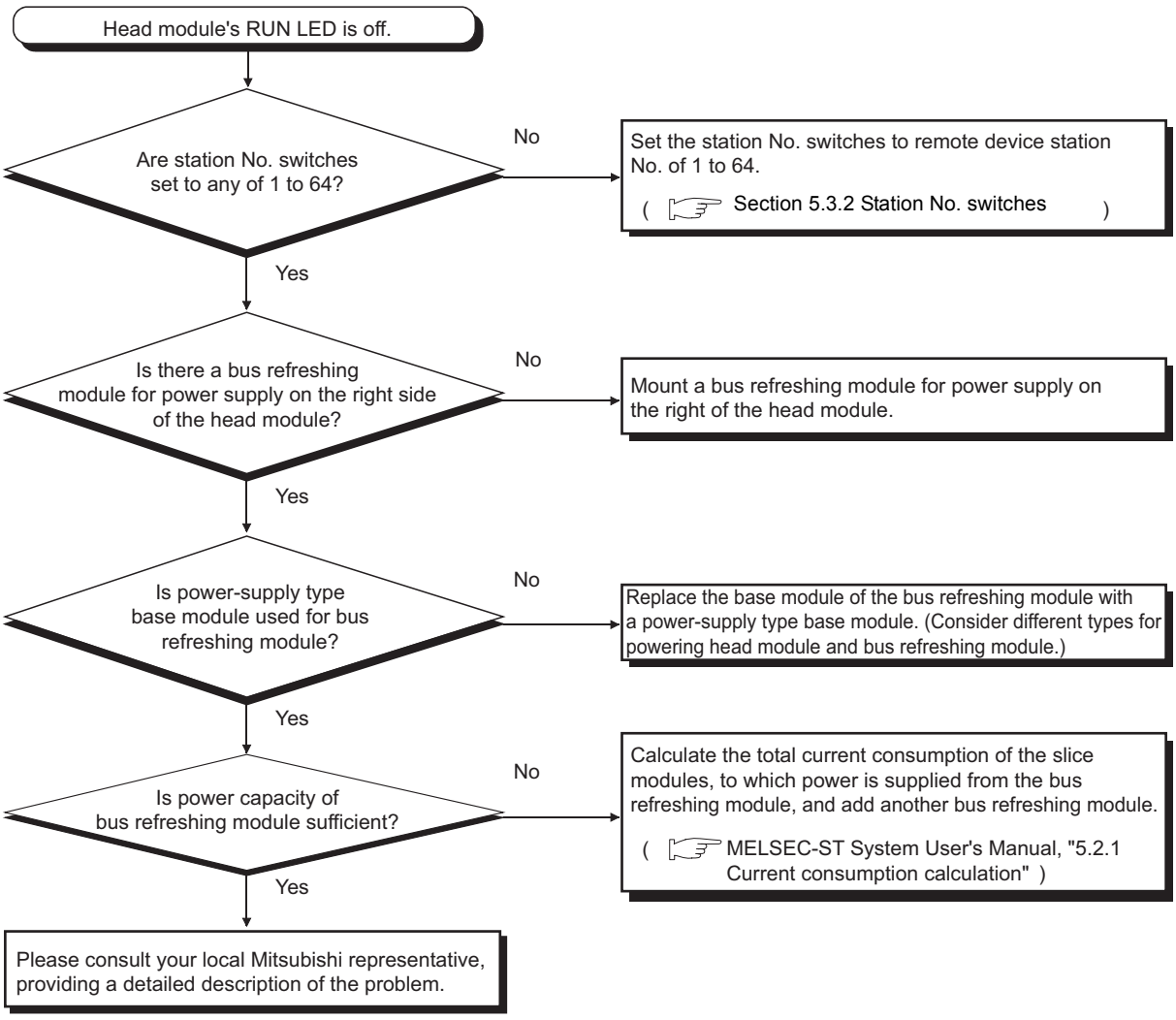

Head module's RUN LED is off.
Are station No. switches set to any of 1 to 64?
No
Set the station No. switches to remote device station No. of 1 to 64.
(Section 5.3.2 Station No. switches)
Yes
Is there a bus refreshing module for power supply on the right side of the head module?
No
Mount a bus refreshing module for power supply on the right of the head module.
Yes
Is power-supply type base module used for bus refreshing module?
No
Replace the base module of the bus refreshing module with a power-supply type base module. (Consider different types for powering head module and bus refreshing module.)
Yes
Is power capacity of bus refreshing module sufficient?
No
Calculate the total current consumption of the slice modules, to which power is supplied from the bus refreshing module, and add another bus refreshing module.
(MELSEC-ST System User's Manual, "5.2.1 Current consumption calculation")
Yes
Please consult your local Mitsubishi representative, providing a detailed description of the problem.

Figure 9.3 When the RUN LED is off

9.4.2 When the L ERR. LED is on or flashing

When the L ERR. LED of the head module is on or flashing, troubleshoot the problem according to the following.

(1) When the L ERR. LED is on

Check if the station No. switches are set to station No. of the remote device station (1 to 64) (☞ Section 5.3.2 Station No. switches)

If the L ERR. LED is on with the station No. set to any of 1 to 64, please consult your local Mitsubishi representative, providing a detailed description of the problem.

(2) When the L ERR. LED is flashing (regularly)

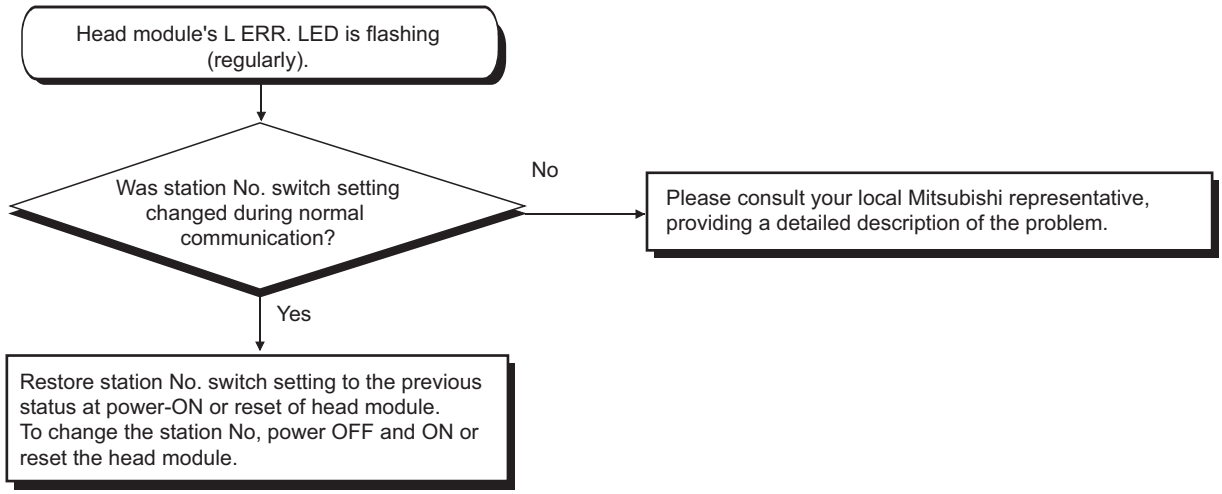

Head module's L ERR. LED is flashing (regularly).
Was station No. switch setting changed during normal communication?
No
Please consult your local Mitsubishi representative, providing a detailed description of the problem.
Yes
Restore station No. switch setting to the previous status at power-ON or reset of head module.
To change the station No, power OFF and ON or reset the head module.

Figure 9.4 When the L ERR. LED is flashing (regularly)

(3) When the L ERR. LED is flashing (irregularly)

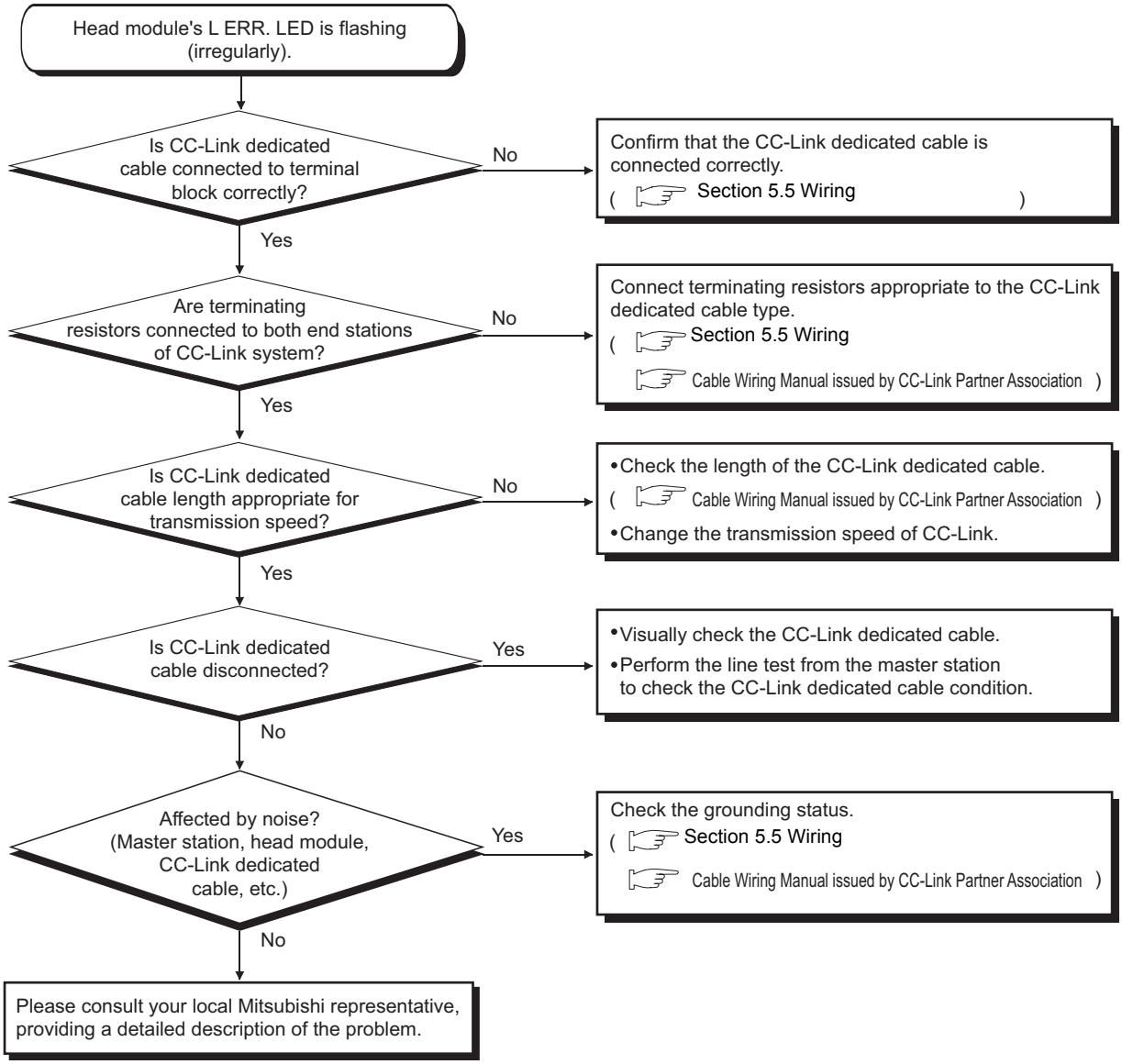

Head module's L ERR. LED is flashing (irregularly).
Is CC-Link dedicated cable connected to terminal block correctly?
No
Confirm that the CC-Link dedicated cable is connected correctly.
(Section 5.5 Wiring)
Yes
Are terminating resistors connected to both end stations of CC-Link system?
No
Connect terminating resistors appropriate to the CC-Link dedicated cable type.
(Section 5.5 Wiring
Cable Wiring Manual issued by CC-Link Partner Association)
Yes
Is CC-Link dedicated cable length appropriate for transmission speed?
No
•Check the length of the CC-Link dedicated cable.
(Cable Wiring Manual issued by CC-Link Partner Association)
•Change the transmission speed of CC-Link.
Yes
Is CC-Link dedicated cable disconnected?
Yes
•Visually check the CC-Link dedicated cable.
•Perform the line test from the master station to check the CC-Link dedicated cable condition.
No
Affected by noise? (Master station, head module, CC-Link dedicated cable, etc.)
Yes
Check the grounding status.
(Section 5.5 Wiring
Cable Wiring Manual issued by CC-Link Partner Association)
No
Please consult your local Mitsubishi representative, providing a detailed description of the problem.

Figure 9.5 When the L ERR. LED is flashing (irregularly)

9.4.3 When the L RUN LED is off

When the L RUN LED of the head module is off, troubleshoot the problem according to the following.

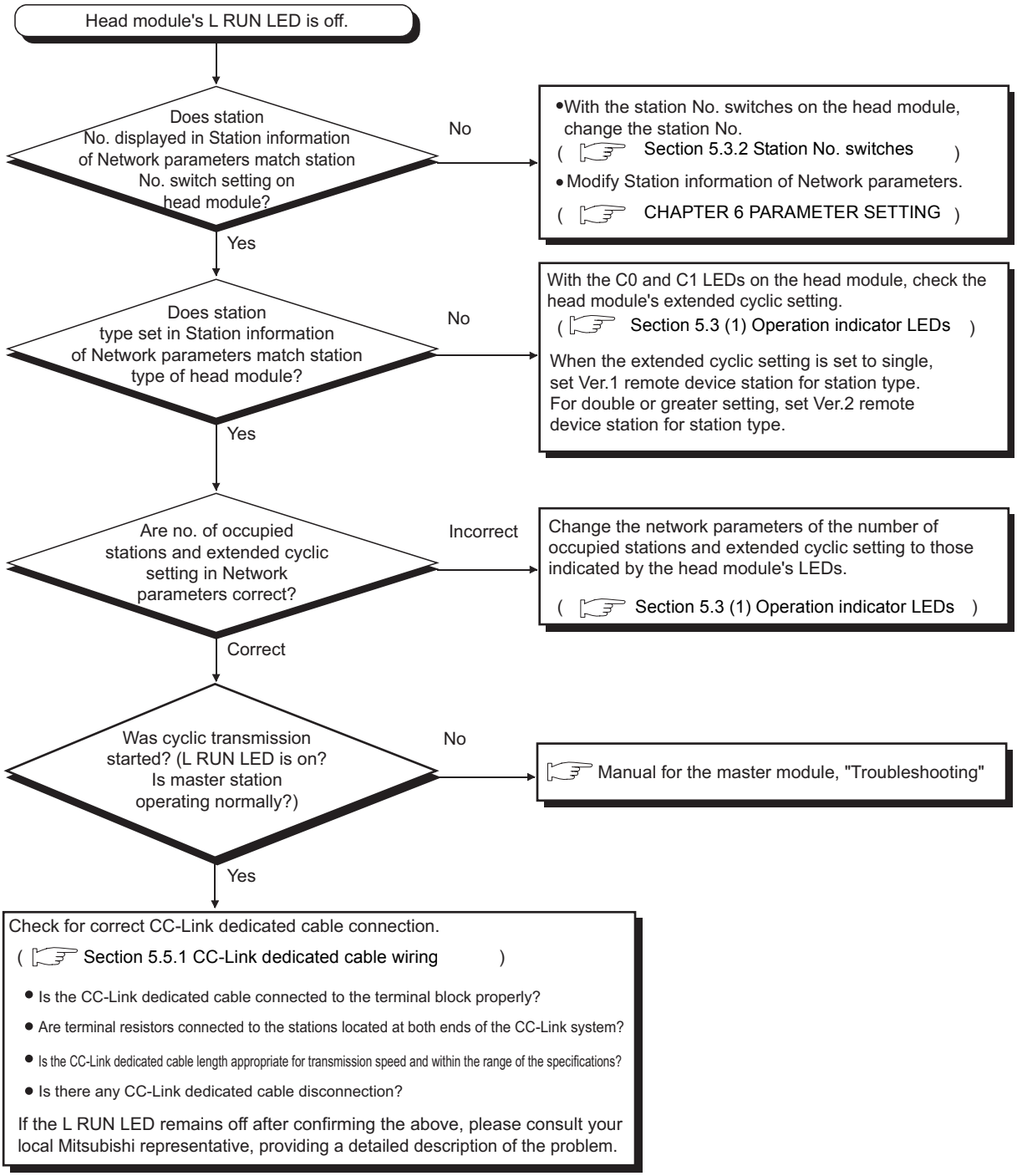

Head module's L RUN LED is off.
Does station No. displayed in Station information of Network parameters match station No. switch setting on head module?
No
•With the station No. switches on the head module, change the station No.
(Section 5.3.2 Station No. switches)
• Modify Station information of Network parameters.
(CHAPTER 6 PARAMETER SETTING)
Yes
Does station type set in Station information of Network parameters match station type of head module?
No
With the C0 and C1 LEDs on the head module, check the head module's extended cyclic setting.
(Section 5.3 (1) Operation indicator LEDs)
When the extended cyclic setting is set to single, set Ver.1 remote device station for station type.
For double or greater setting, set Ver.2 remote device station for station type.
Yes
Are no. of occupied stations and extended cyclic setting in Network parameters correct?
Incorrect
Change the network parameters of the number of occupied stations and extended cyclic setting to those indicated by the head module's LEDs.
(Section 5.3 (1) Operation indicator LEDs)
Correct
Was cyclic transmission started? (L RUN LED is on? Is master station operating normally?)
No
Manual for the master module, "Troubleshooting"
Yes
Check for correct CC-Link dedicated cable connection.
(Section 5.5.1 CC-Link dedicated cable wiring)
• Is the CC-Link dedicated cable connected to the terminal block properly?
• Are terminal resistors connected to the stations located at both ends of the CC-Link system?
• Is the CC-Link dedicated cable length appropriate for transmission speed and within the range of the specifications?
• Is there any CC-Link dedicated cable disconnection?
If the L RUN LED remains off after confirming the above, please consult your local Mitsubishi representative, providing a detailed description of the problem.

Figure 9.6 When the L RUN LED is off

9.4.4 When the ERR. LED is on or flashing

When the ERR. LED of the head module is on or flashing, troubleshoot the problem according to the following.

(1) When the ERR. LED is on

Read the error code, and take corrective actions. (☞ Section 9.7 Error Codes)

(2) When the ERR. LED is flashing

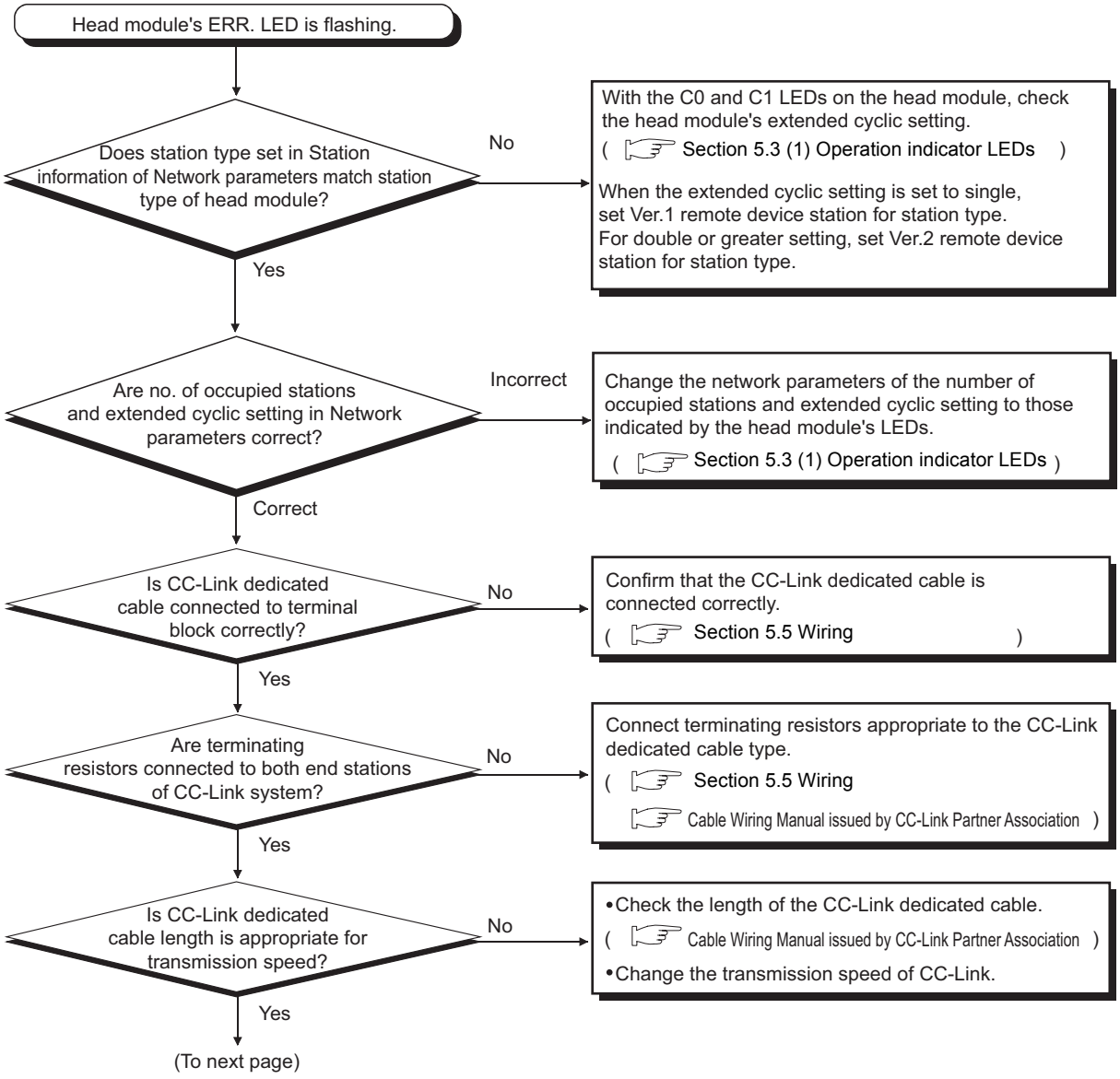

Head module's ERR. LED is flashing.
Does station type set in Station information of Network parameters match station type of head module?
No
With the C0 and C1 LEDs on the head module, check the head module's extended cyclic setting.
(☞ Section 5.3 (1) Operation indicator LEDs)
When the extended cyclic setting is set to single, set Ver.1 remote device station for station type.
For double or greater setting, set Ver.2 remote device station for station type.
Yes
Are no. of occupied stations and extended cyclic setting in Network parameters correct?
Incorrect
Change the network parameters of the number of occupied stations and extended cyclic setting to those indicated by the head module's LEDs.
(☞ Section 5.3 (1) Operation indicator LEDs)
Correct
Is CC-Link dedicated cable connected to terminal block correctly?
No
Confirm that the CC-Link dedicated cable is connected correctly.
(☞ Section 5.5 Wiring)
Yes
Are terminating resistors connected to both end stations of CC-Link system?
No
Connect terminating resistors appropriate to the CC-Link dedicated cable type.
(☞ Section 5.5 Wiring
☞ Cable Wiring Manual issued by CC-Link Partner Association)
Yes
Is CC-Link dedicated cable length is appropriate for transmission speed?
No
•Check the length of the CC-Link dedicated cable.
(☞ Cable Wiring Manual issued by CC-Link Partner Association)
•Change the transmission speed of CC-Link.
Yes
(To next page)

Figure 9.7 When the ERR. LED is flashing

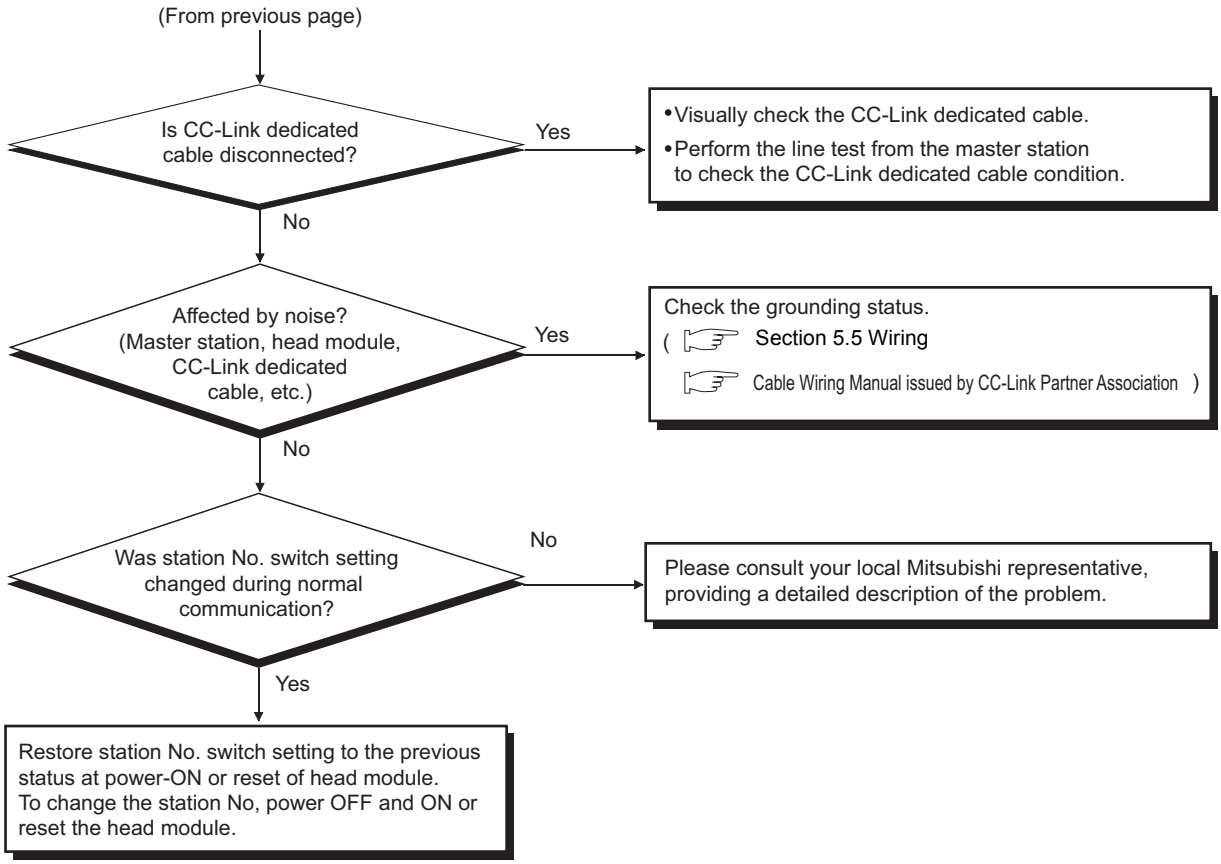

(From previous page)
Is CC-Link dedicated cable disconnected?
Yes
•Visually check the CC-Link dedicated cable.
•Perform the line test from the master station to check the CC-Link dedicated cable condition.
No
Affected by noise? (Master station, head module, CC-Link dedicated cable, etc.)
Yes
Check the grounding status.
(Section 5.5 Wiring
Cable Wiring Manual issued by CC-Link Partner Association)
No
Was station No. switch setting changed during normal communication?
No
Please consult your local Mitsubishi representative, providing a detailed description of the problem.
Yes
Restore station No. switch setting to the previous status at power-ON or reset of head module.
To change the station No, power OFF and ON or reset the head module.

Figure 9.7 When the ERR. LED is flashing (continued)

9.5 When Cyclic Transmission is not Available

When cyclic transmission is not available, troubleshoot the problem according to the following.

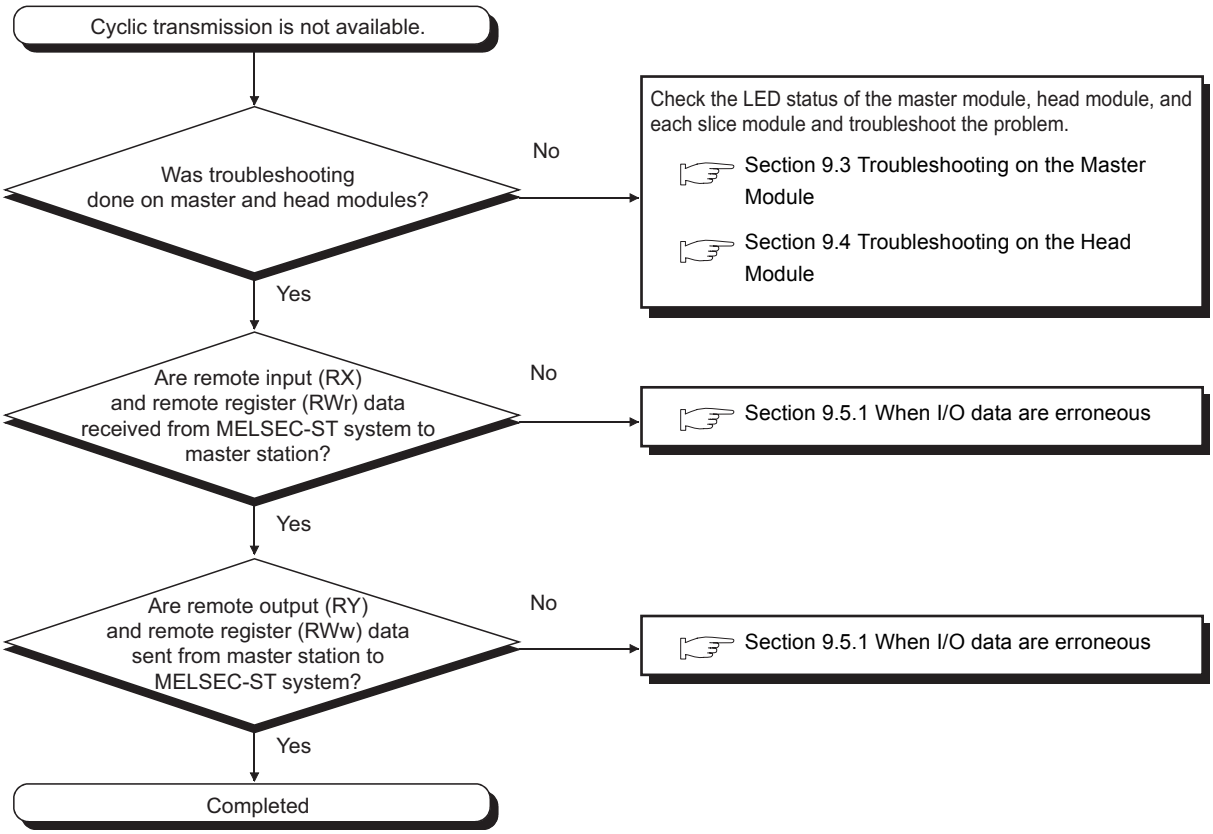

Cyclic transmission is not available.
Was troubleshooting done on master and head modules?
No
Check the LED status of the master module, head module, and each slice module and troubleshoot the problem.
Section 9.3 Troubleshooting on the Master Module
Section 9.4 Troubleshooting on the Head Module
Yes
Are remote input (RX) and remote register (RWr) data received from MELSEC-ST system to master station?
No
Section 9.5.1 When I/O data are erroneous
Yes
Are remote output (RY) and remote register (RWw) data sent from master station to MELSEC-ST system?
No
Section 9.5.1 When I/O data are erroneous
Yes
Completed

Figure 9.8 When cyclic transmission is not available

9.5.1 When I/O data are erroneous

When I/O data are erroneous, troubleshoot the problem according to the following.

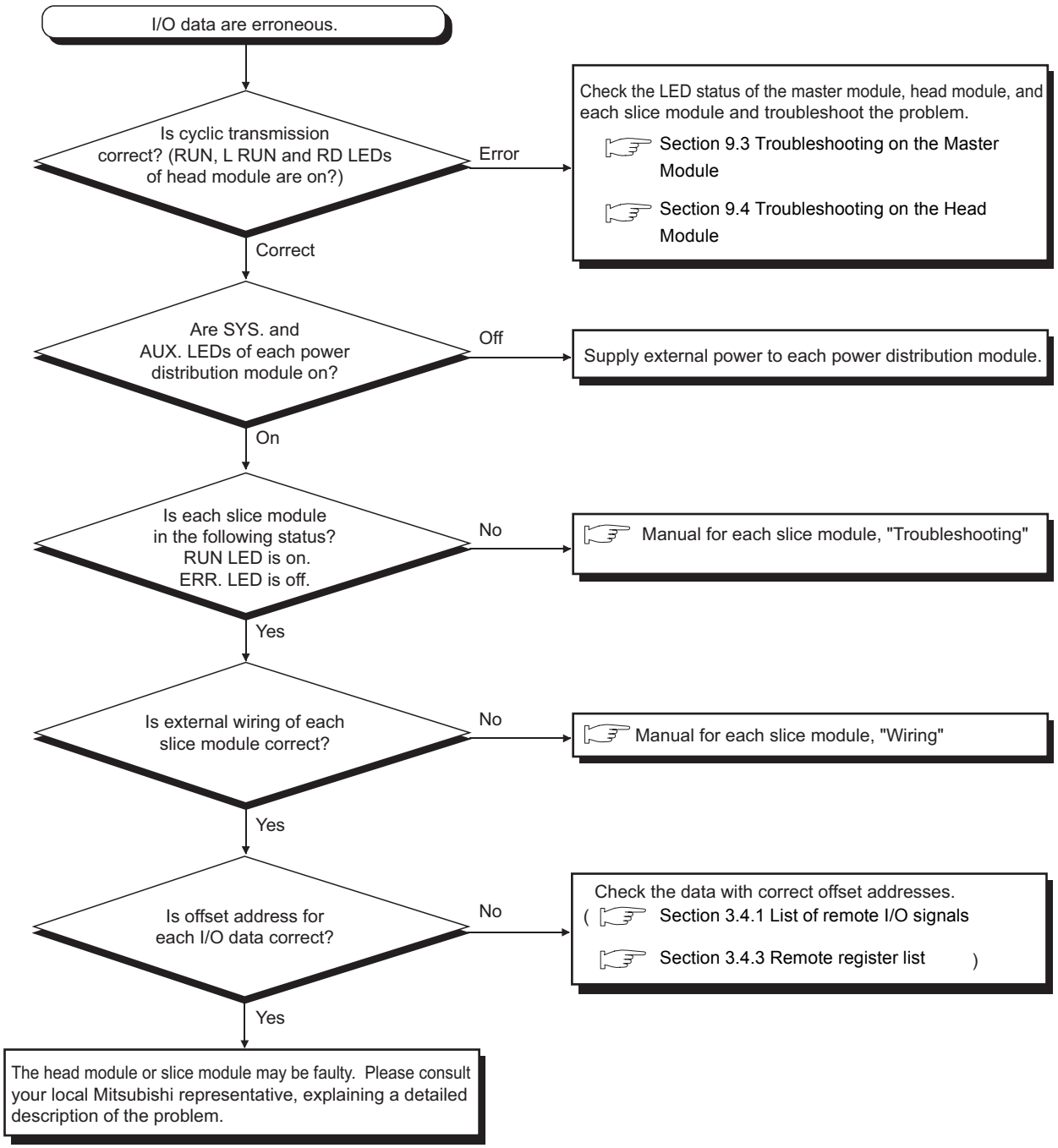

I/O data are erroneous.
Is cyclic transmission correct? (RUN, L RUN and RD LEDs of head module are on?)
Error
Check the LED status of the master module, head module, and each slice module and troubleshoot the problem.
Section 9.3 Troubleshooting on the Master Module
Section 9.4 Troubleshooting on the Head Module
Correct
Are SYS. and AUX. LEDs of each power distribution module on?
Off
Supply external power to each power distribution module.
On
Is each slice module in the following status? RUN LED is on. ERR. LED is off.
No
Manual for each slice module, "Troubleshooting"
Yes
Is external wiring of each slice module correct?
No
Manual for each slice module, "Wiring"
Yes
Is offset address for each I/O data correct?
No
Check the data with correct offset addresses.
(Section 3.4.1 List of remote I/O signals
Section 3.4.3 Remote register list)
Yes
The head module or slice module may be faulty. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

Figure 9.9 When I/O data are erroneous

9.6 When Commands cannot be Executed

When commands cannot be executed from the master station, identify the error code by the following procedures and take actions for the error code.

1) Check the error code in the master station's dedicated instruction (RDMSG), and take corrective actions.
   An error code is stored in Completion status ((S1)+0).
   For the stored error codes, refer to the following manual.
   ☞Manual for the master module, "Section 13.3 Error Codes"
2) If no error code is stored in Completion status ((S1)+0), check the command execution result.
   The command execution result is stored in Receive data ((D1)+1).
   For the stored command execution results, refer to the following.
   ☞Section 8.4 Values Stored into Command Execution Result
   ☞Section 9.7.2 Error code list

9.7 Error Codes

When an error occurs in the head module, the ERR. or L ERR. LED turns on or flashes. This section explains how to read error codes of the head module, and its error codes.

9.7.1 Reading error codes

Error codes can be read out by either of the following.

- GX Configurator-ST
- Command (Error code read request (command No.: 8101H/0101H))

(1) Using GX Configurator-ST

Connect a personal computer to the head module, and check the operating status of each module and error codes from GX Configurator-ST.
Such information can be viewed on the "System Monitor" and "Module Detail Information" screens in GX Configurator-ST.
For the operation method, refer to the following manual.
☞ GX Configurator-ST Operating Manual

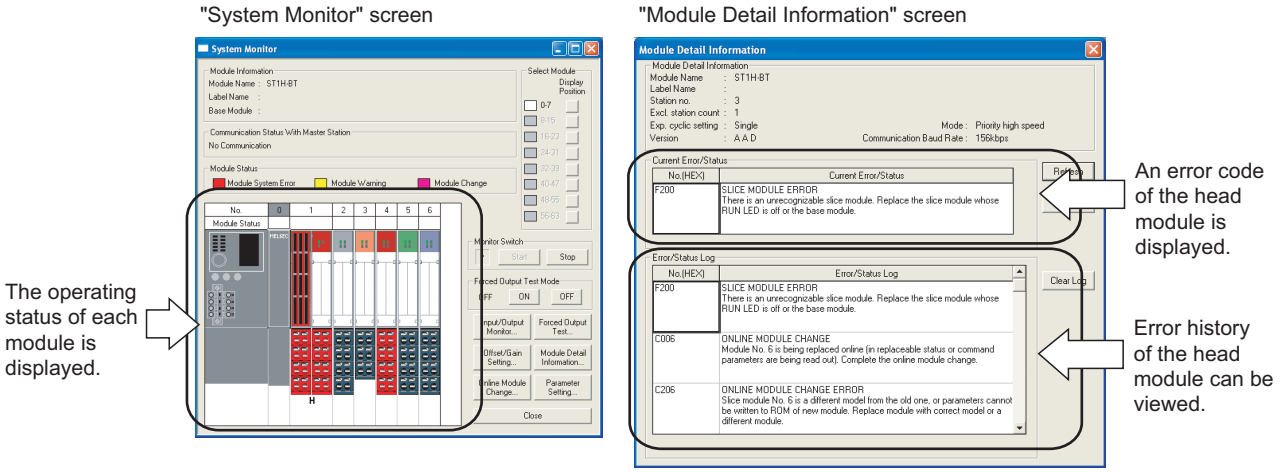

"System Monitor" screen
"Module Detail Information" screen
The operating status of each module is displayed.
An error code of the head module is displayed.
Error history of the head module can be viewed.

Figure 9.10 Using GX Configurator-ST

(2) Using a command

Read error codes with Error code read request (command No.: 8101H/0101H).
(☞ Section 8.2.2 Error code read request (Command No.: 8101H/0101H))

POINT

Since commands cannot be executed in the following cases, connect GX Configurator-ST to the head module to read out error codes.

- When cyclic transmission has not been performed yet (The L RUN LED is off.)
- When cyclic transmission is not performed normally due to the affect of noise. (The L ERR. LED flashes (irregularly).)

9.7.2 Error code list

The table below is the error code list of the head module.
For error code reading, refer to the following.
☞ Section 9.7.1 Reading error codes

(1) Error code list

(a) Error codes for communication
If any of the following errors occurs during online module change, no error code is recorded.

Table 9.2 Error codes for communication

Error code (Hex.)	Error name	Description	Action
B100H	Station No. error	The station No. is out of range.	Check that the station setting switches are set within the range of 1 to 64. (☞ Section 5.3.2 Station No. switches)
E100H	Communication error	Communication with the master station is faulty.	•Check the master station status. •Check the network wiring status.
E101H	Message transmission error	An error occurred during message transmission.	•Check the procedure for using commands. (☞ CHAPTER 8 COMMANDS) •Check the network wiring status.
E102H	CC-Link version mismatch error	While the head module is a Ver.2 remote device station, the master module is set to Remote net Ver.1 mode.	•In network parameters, change the mode of the master module to Remote net Ver.2 mode or Remote net additional mode. •If Ver.1 mode is intended to be used, modify the point settings for the slice modules so that the head module can be a Ver.1 remote device station. (☞ Section 4.2.2 (2) Priority modes in auto-optimization)
F200H	Slice module error	There is an unrecognizable slice module.	Replace the slice module whose RUN LED is off or the base module.
F201H	Switch setting change error	A switch setting on the head module was changed after power-on or reset of the head module.	•Restore the switch setting to the previous condition set at power-on or reset of the head module. •To change the station No. after power-on or reset of the head module, restart (reset or reapply external power to) the head module.
F202H	Module setup error	No bus refreshing module is mounted next to the right of the head module.	Mount a bus refreshing module next to the right of the head module.
F203H	Command parameter error	There is a slice module for which command parameters could not be set.	Check the command execution results that are stored in Cr Command result area.
F204H*1	System power failure	A momentary power failure occurred in the bus refreshing module (the one next to the right of the head module) that was supplying power to the head module.	Check if a momentary power failure has occurred in the external system power supply for the bus refreshing module.
F205H	Command simultaneous execution invalid	A command that is not executable with another was executed simultaneously with another command.	The following commands cannot be executed concurrently with another command. Modify the program to prevent concurrent execution. •Initial data batch write request (Command No.: 8106H) •Initial data individual write request (Command No.: 8107H/0107H)

Table 9.2 Error codes for communication(Continued)

Error code (Hex.)	Error name	Description	Action
F206H	Invalid module	Initial data write request cannot be executed.	Check if the ST1H-BT is in the following condition in which the initial data write request can be executed. •Output data are all OFF. •Not in online module change mode.
F207H	Command format invalid	The format of the command parameters is invalid.	Check the command parameters set in Cw Command execution area. (☞ Section 8.2 Commands)
F301H to F33FH*2 *3	System power failure	An error has occurred in the bus refreshing module. In the low bytes, slice position No.1 to No.63 (01H to 3FH) are stored.	•Check the status of the external system power supply that powers the bus refreshing module. •Replace the bus refreshing module.

* 1 The ERR. LED does not turn on or flash.
If a momentary power failure occurs in the bus refreshing module that powers the head module, the error information is recorded in the error history.
* 2 The one byte shown below denotes the slice position No. (where the slice module is positioned).
(Example) Tenth slice module: **0AH
* 3 If none of error codes F301H to F33FH is generated while the bus refreshing module's ERR. LED is on or flashing, check for an error code of the bus refreshing module.

(b) Operation status codes and error codes for online module change

Table 9.3 Operation status codes and error codes for online module change

Error code (Hex.)	Error name	Description	Action
C001H to C03FH*1	- (Normal)	A module is being replaced online (in replaceable status). In the low bytes, slice position No.1 to No.63 (01H to 3FH) are stored.	Complete the online module change. (☞ Section 4.6 Online Module Change Function)
		A module is being replaced online (command parameters being read out). In the low bytes, slice position No.1 to No.63 (01H to 3FH) are stored.	
C101H to C13FH*1*2	Online module change error	Parameters of the intelligent function module cannot be read from its ROM. (During online module change) In the low bytes, slice position No.1 to No.63 (01H to 3FH) are stored.	After the online module change, write the intelligent function module parameters with GX Configurator-ST or a command, with the RUN LED flashing or lit.
		Parameters of the intelligent function module cannot be read from its ROM. (After completion of online module change) In the low bytes, slice position No.1 to No.63 (01H to 3FH) are stored.	
C201H to C23FH*1	Online module change error	The slice module model currently mounted is different from the previous one. Or, the intelligent function module parameters cannot be written to ROM of the intelligent function module that is currently mounted. In the low bytes, slice position No.1 to No.63 (01H to 3FH) are stored.	•If the mounted slice module model is different from the previous one, replace it with a slice module of the same model as the previous one. •If the mounted slice module model is the same as the previous one, replace it with another.

* 1 The one byte shown below denotes the slice position No. (where the slice module is positioned).
(Example) Tenth slice module: **0AH
* 2 If any of C101H to C13FH occurs, the ERR. LED remains on until the next online module change.
To turn off the ERR. LED, set Error reset request (RYnA) to ON after online module change.

(c) Operation status codes for forced output test mode

Table 9.4 Operation status codes for forced output test mode

Error code (Hex.)	Error name	Description	Action
D000H	- (Normal)	Forced output test mode is active.	From Configurator-ST, exit the forced output test mode. (☞ GX Configurator-ST Operating Manual)

APPENDICES

Appendix 1 External Dimensions

(1) Head module (ST1H-BT)

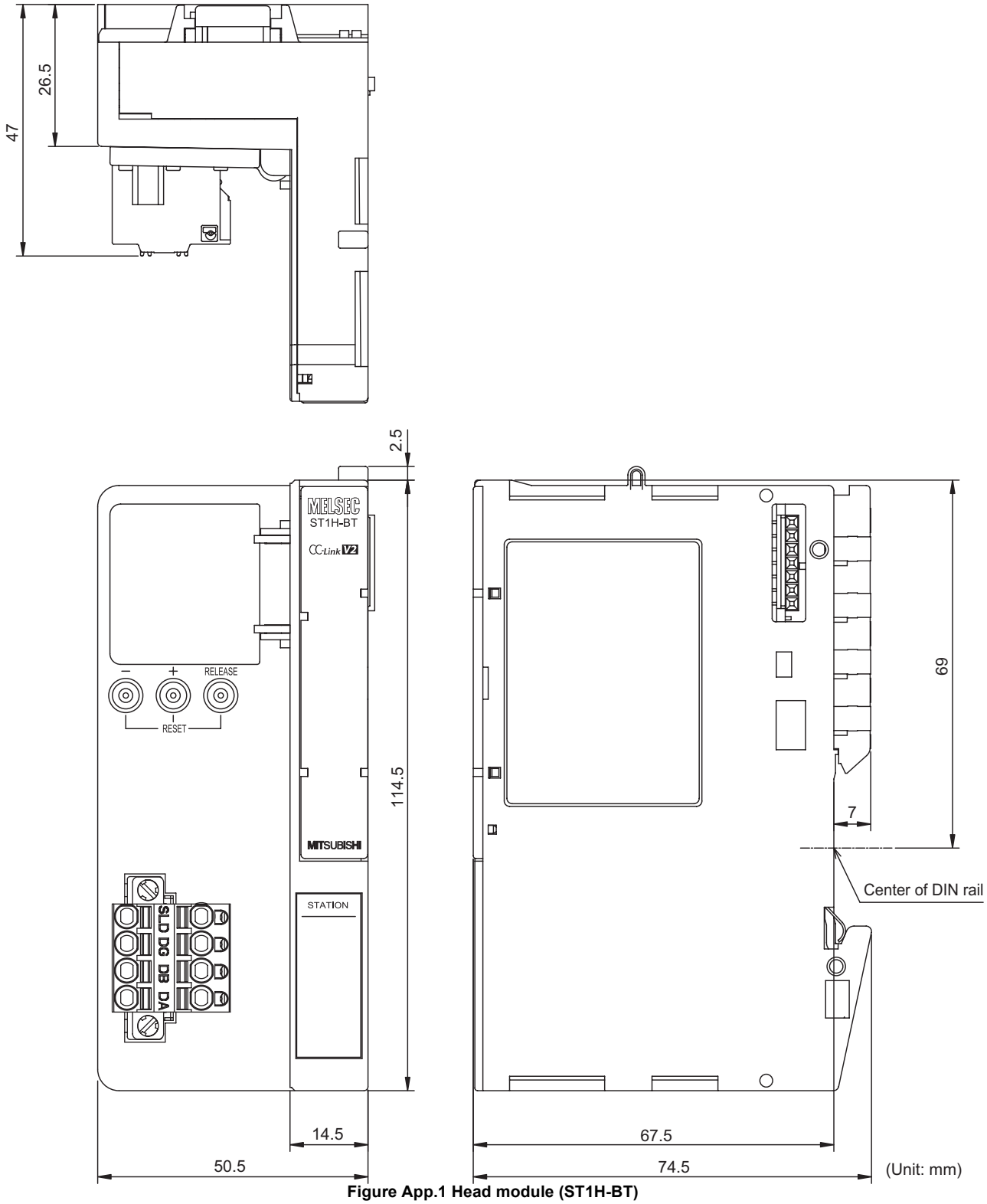


Figure App.1 Head module (ST1H-BT)

(2) End plate (ST1A-EPL)

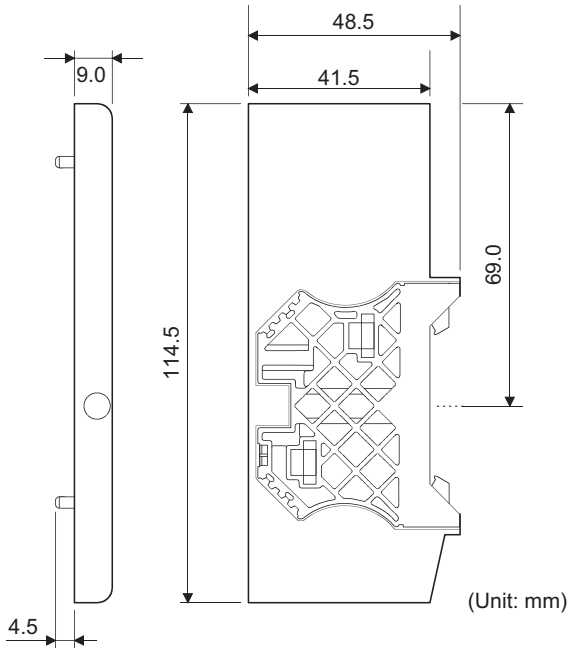


Figure App.2 End plate (ST1A-EPL)*1

* 1 The above figure shows the end plate with the end bracket attached.

(3) End bracket (ST1A-EBR)

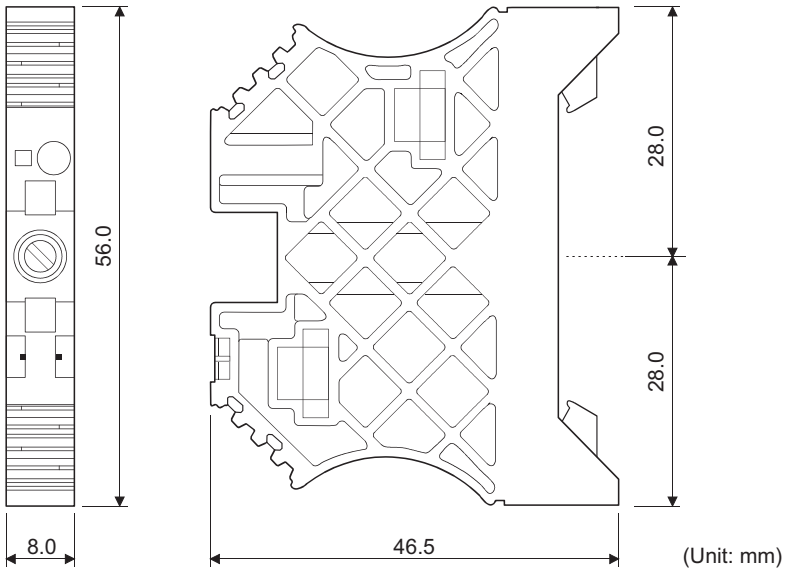


Figure App.3 End bracket (ST1A-EBR)

Appendix 2 Recommended Screwdriver

The following screwdriver is recommended for the terminal block of the head module.

Table App.1 Recommended screwdriver

Product	Part number	Manufacturer	Specification	Size (mm)		
				A	B	C
SD	900833	Weidmueller	Slotted screwdriver without insulating cover (Blade shape according to DIN5264)	0.6	3.5	100

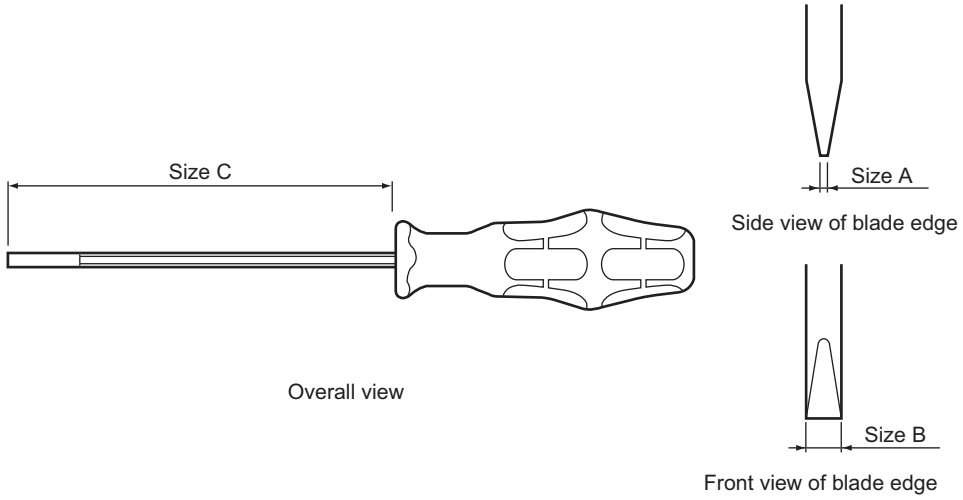


Figure App.4 Recommended screwdriver

Appendix 3 MELSEC-ST System Setting Sheet

The MELSEC-ST system setting sheet is useful for considering the MELSEC-ST system.
Make photocopies of the MELSEC-ST system setting sheet for use.
Refer to the following for information on how to use it.
☞CHAPTER 7 PROGRAMMING

Appendix 3.1 I/O points sheet

Table App.2 I/O points sheet

Slice position No.	Start slice No. (Number of occupied slices)	Module name	Br.n	Bw.n	Wr.n	Ww.n	5V DC internal current consumption (Total)	24V DC current (Total)	Slot width (Total)
0	0(2)	ST1H-BT	0	0	0	0	0.410A (0.410A)	0A (0A)	-
1	2(1)	ST1PSD	0	0	0	0	-	-	25.2mm (25.2mm)
2	( )								
3	( )								
4	( )								
5	( )								
6	( )								
7	( )								
8	( )								
9	( )								
Total			(252 bits or less)*1 *2	(252 bits or less)*1 *2	(52 words or less)*1	(52 words or less)*1	-	-	Total (850mm or less)

* 1 When the master module is in Remote net Ver.1 mode, configure the system so that the respective total values are within the following ranges.

Table App.3 Ranges of I/O points (Remote net Ver.1 mode)

Item	Point
Br.n Bit input area	112 bits or less
Bw.n Bit output area	112 bits or less
Wr.n Word input area	14 words or less
Ww.n Word output area	14 words or less

* 2 The available points will decrease by two points for each additional power distribution module.

Appendix 3.2 Input data assignment sheet

(1) "Br" Bit input area

Table App.4 Br Bit input area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote input (RX)	Slice position No.	Module name	Br.n	Data name
	RX			Br.☐0	
	RX			Br.☐1	
	RX			Br.☐2	
	RX			Br.☐3	
	RX			Br.☐4	
	RX			Br.☐5	
	RX			Br.☐6	
	RX			Br.☐7	
	RX			Br.☐8	
	RX			Br.☐9	
	RX			Br.☐A	
	RX			Br.☐B	
	RX			Br.☐C	
	RX			Br.☐D	
	RX			Br.☐E	
	RX			Br.☐F	

(2) "Wr" Word input area

Table App.5 Wr Word input area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote register (RWr)	Slice position No.	Module name	Wr.n	Data name
	RWr			Wr.☐0	
	RWr			Wr.☐1	
	RWr			Wr.☐2	
	RWr			Wr.☐3	
	RWr			Wr.☐4	
	RWr			Wr.☐5	
	RWr			Wr.☐6	
	RWr			Wr.☐7	
	RWr			Wr.☐8	
	RWr			Wr.☐9	
	RWr			Wr.☐A	
	RWr			Wr.☐B	
	RWr			Wr.☐C	
	RWr			Wr.☐D	
	RWr			Wr.☐E	
	RWr			Wr.☐F	

Appendix 3.3 Output data assignment sheet

(1) "Bw" Bit output area

Table App.6 Bw Bit output area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote output (RY)	Slice position No.	Module name	Bw.n	Data name
	RY			Bw.☐0	
	RY			Bw.☐1	
	RY			Bw.☐2	
	RY			Bw.☐3	
	RY			Bw.☐4	
	RY			Bw.☐5	
	RY			Bw.☐6	
	RY			Bw.☐7	
	RY			Bw.☐8	
	RY			Bw.☐9	
	RY			Bw.☐A	
	RY			Bw.☐B	
	RY			Bw.☐C	
	RY			Bw.☐D	
	RY			Bw.☐E	
	RY			Bw.☐F	

(2) "Ww" Word output area

Table App.7 Ww Word output area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote register (RWw)	Slice position No.	Module name	Ww.n	Data name
	RWw			Ww.☐0	
	RWw			Ww.☐1	
	RWw			Ww.☐2	
	RWw			Ww.☐3	
	RWw			Ww.☐4	
	RWw			Ww.☐5	
	RWw			Ww.☐6	
	RWw			Ww.☐7	
	RWw			Ww.☐8	
	RWw			Ww.☐9	
	RWw			Ww.☐A	
	RWw			Ww.☐B	
	RWw			Ww.☐C	
	RWw			Ww.☐D	
	RWw			Ww.☐E	
	RWw			Ww.☐F	

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[I]

I/O data ••••••

ST1A-EPL ••••••

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.

Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.

In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.

However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

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SH(NA)-080754ENG-A

MELSEC-ST CC-Link
Head Module
User's Manual

MODEL	ST1H-BT-U-SY-E
MODEL CODE	13JZ11
SH(NA)-080754ENG-A(0804)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

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